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	AF 1 Physics of heat therapy **Schwarzschild**	AF 4 Sources of heat radiation **Carter**	AF 7 Physiologic effects of heat **Polmer**	AF 10 Physiology of massage and exercise **Elkins**
	AC 1 Fundamentals of physical therapy in general practice **Phillips**	AC 4 Physical therapy in arthritis **Solomon**	AC 7 Physical therapy in pediatrics **R. Lowry**	AC 10 P. T. in dermatology **Cipollaro**
	AG 1 Occupational therapy **Helen Willard**	AG 4 Low back pain **Harpuder**	AG 7 Operation of hospital department of physical therapy **Watkins**	AG 10 P. T. in poliomyelitis **Bennett**
9:30 to 10:30 A. M.	E 2 General application of heat (fever therapy) **Kendell**	E 5 Electrotherapy: low voltage currents **Kovacs**	E 8 Massage **McLoughlin**	E 11 Clinical aspects of physical therapy **Bennett**
	AF 2 Physics of light therapy **Anderson**	AF 5 Sources of ultraviolet radiation **Ollinger**	AF 8 Sources of low voltage and high frequency currents **Kobak**	AF 11 Research technic in physical therapy **Moor**
	AC 2 Physical therapy in surgery **Titus**	AC 5 P. T. in obstetrics and gynecology **Madge McGuinness**	AC 8 Physical therapy in neurology **Schmidt**	AC 11 Colonic irrigations **Martucci**
	AG 2 Physical therapy in amputations **Coulter**	AG 5 Fever therapy **Bierman**	AG 8 Physical therapy in peripheral nerve injuries **Strickland**	AG 11 Physical therapy in fractures **Knapp**
11 A. M. to 12 Noon	E 3 Light therapy: infra-red radiation **Kovacs**	E 6 Electrotherapy: high frequency currents **Schmitt**	E 9 Corrective exercise **Ewerhardt**	E 12 Administration of physical therapy department **Molander**
	AF 3 Physiologic effects of hydrotherapy and climatotherapy **Singer**	AF 6 Physiologic effects of ultraviolet radiation **Libbert**	AF 9 Physics of electrotherapy **Carter**	AF 12 Correlation of fundamental and clinical aspects of physical therapy **McLoughlin**
	AC 3 Physical therapy in orthopedics **Kendrick**	AC 6 Physical therapy in otorhinolaryngology **Hollender**	AC 9 P. T. in peripheral vascular diseases **Hildenbrand**	AC 12 Physical therapy in industrial medicine **Weiss**
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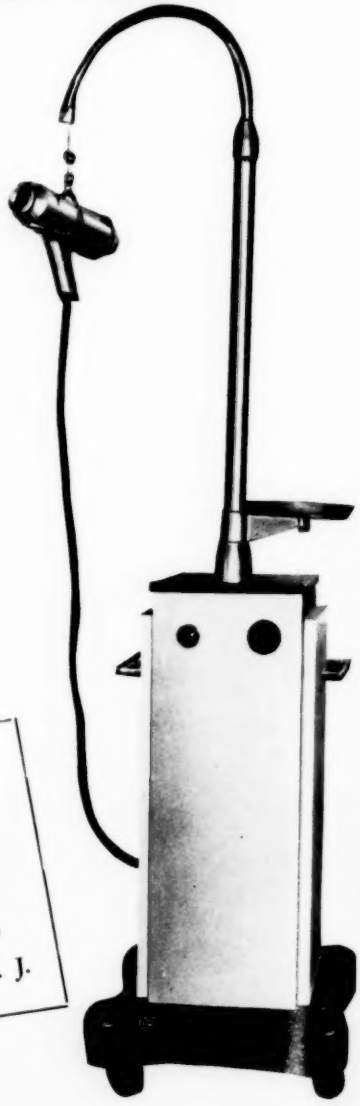

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DIATHERMY IN THE TREATMENT OF IRRITABLE COLON

Preliminary Report *

WALTER J. ZEITER, M.D.

Department of Medicine and Director of Physical Therapy

and

R. F. RENSHAW, M.D.

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CLEVELAND, OHIO

Spasm in the gastrointestinal tract commonly is treated with heat obtained from a hot water bottle, electric pad or hot compresses. In the following cases of irritable colon, short wave diathermy was used as an adjunct to the usual forms of therapy. Of a series of 50 cases, short wave diathermy was given adequate trial in 25 cases which are included in this preliminary report.

Irritable colon is a variable syndrome due to a functional disturbance of the colon with or without concomitant symptoms referable to other parts of the gastrointestinal tract. The term irritable colon does not refer to simple constipation or diarrhea unless the dysfunction is related directly to the chief cause of the patient's abdominal distress. Synonyms for irritable colon include colitis, spastic constipation, mucous colitis, unstable colon and nervous indigestion. To make the diagnosis of irritable colon, any organic disease, not only of the intestinal tract but of any other organ, must be excluded positively.

In this report, we are not introducing a new method of therapy. The value of heat in the treatment of spasm of the smooth muscle has long been recognized. Roosen[1] in 1928 said, "While the sedative, antispasmodic effect of diathermy is well known, and is used successfully in the treatment of spastic constipation, the knowledge of its effect of promoting peristalsis is not widely distributed." In the voluminous literature on irritable colon, innumerable references emphasize the beneficial effect of heat, often stated in general or nonspecific terms, and rarely is diathermy even suggested.

Rendall[2] in discussing diathermy in the treatment of obstinate constipation, said, "Diathermy is hardly mentioned in English textbooks in connection with the treatment of constipation." She further stated that "heat is the best means of relaxing any muscular spasm and, while relaxing the abnormal contractions, normal peristalsis can be encouraged by means of improved blood-supply."

Salient evidence that a spastic colon is relaxed by local diathermy has been presented by Osgood.[3] He observed this by filling the colon with barium sulfate and watching the effects of diathermy under fluoroscopy.

DePew[4] found diathermy of value in cases of constipation, especially those in which there was considerable soreness of the abdomen.

Kovács,[5] Johnsen,[6] Fishbaugh[7] and a report by the Council on Physical Therapy of the American Medical Association[8] stated that diathermy was found to be beneficial. On the other hand, Weissenberg[9] observed that some patients responded readily to diathermy while others did not.

"From these conflicting reports as to the effectiveness of the short wave

* Read at the Eastern Sectional Meeting of the American Congress of Physical Therapy, New York, April 5, and the Southeastern Sectional Meeting of the American Congress of Physical Therapy, Chattanooga, Tennessee, May 26, 1941.

current in the treatment of gastrointestinal diseases," Bierman[9] said, "more data is necessary before its exact possibilities in this field can be determined. Difficulties in evaluation may arise from the natural tendency to utilize concomitantly such measures as rest, dietary changes, and medication."

Our interest in this subject was stimulated by (1) the paucity of adequate reports or studies, (2) the determination and evaluation of the effect of deep heating, (3) a search for a quicker and more efficient method of dealing with severe irritable colon and (4) the need of indications for this type of therapy.

In this series all the patients had a complete physical examination and the usual laboratory tests, including urinalysis, red and white blood cell counts, hemoglobin determination, blood sugar estimation and Wassermann and Kahn tests of the blood. In addition, all but 2 had one to fourteen stool examinations, most of which were special studies for parasites. Twenty of the 25 patients had one or more proctosigmoidoscopic examinations. Twenty-one had complete roentgen studies of the gastrointestinal tract, with oral administration of cholecystographic dye, a barium sulfate meal and a barium sulfate enema. In 4 instances, only colonic examination with a barium sulfate enema was done. Pyelograms, roentgenograms of the chest, etc., were made when indicated.

Of the 25 patients, 18 were women. The ages varied from 24 to 73 years. The duration of symptoms varied from one to four hundred and twenty months (thirty-five years). Pain of varying degree was the predominant symptom.

Short wave diathermy of 24 meters, utilizing electromagnetic induction, was used for all the patients. The abdomen was covered with four thick-

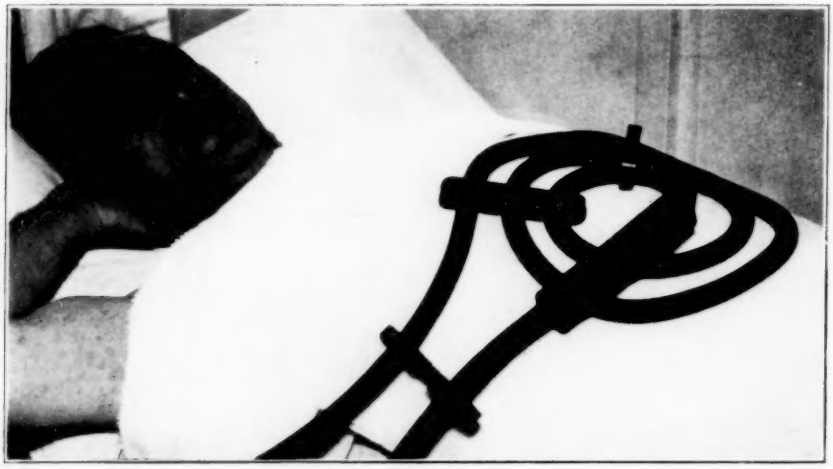

Fig. 1. — Position of cable during treatment.

nesses of turkish toweling, and the cable was coiled into three loops. The treatments were given daily at a comfortable intensity. When treatment was given once daily it was thirty minutes in length, and when it was given twice daily each period was twenty minutes in length. When it was given twice daily the morning treatment was given as early as possible and the second in the late afternoon.

Our results were analyzed from the viewpoint of immediate and delayed response. The period of immediate response was considered to continue during the treatment, and for two hours afterward. Delayed response

was that obtained two days or more after diathermy treatment was started.

The results were further analyzed according to the time diathermy was started in relation to medical management. The medical management in all cases consisted of rest in bed, use of antispasmodics, adequate sedation, dietary supervision, bowel regulation by the judicious use of oil retention or small enemas of saline solution and the application of an electric pad to the abdomen every other hour during the waking hours.

We do not believe that our results obtained by diathermy are invalidated because the patients received multiple therapy. In 7 of 11 instances, as will be shown later, the patients received an adequate trial of the strictest form of medical management without any significant improvement. When diathermy was added to the regimen, the beneficial effect was gratifying.

The immediate results were satisfactory in 8 patients, unsatisfactory in 10 and inconclusive or questionable in 7. On the other hand, the delayed results were satisfactory in 17 patients, unsatisfactory in 7 and inconclusive in 1. Apparently the better delayed results were due to the fact that all the patients had severe symptoms of irritable colon necessitating hospitalization; one would not expect sudden or dramatic improvement in such patients. This fact emphasizes the necessity of continuing the diathermy treatment for at least several days. The number of satisfactory delayed results would indicate the value of diathermy. As additional evidence of this value, we observed that there were 7 of 11 patients who had adequate strict bowel management for five to twenty-one days without relief of symptoms but whose improvement was rapid and satisfactory when diathermy was added to the regimen. The immediate response to diathermy was good in only 2 of these patients, but the delayed improvement was satisfactory in 7. If

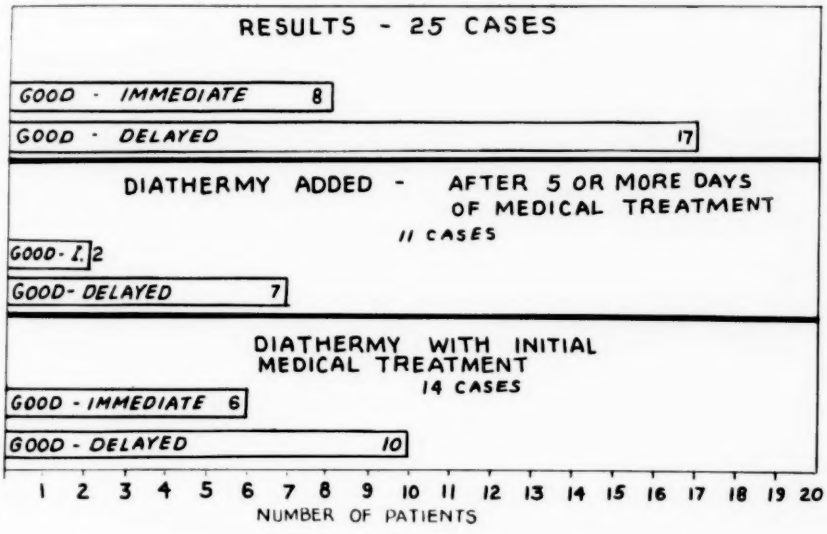
RESULTS - 25 CASES
GOOD - IMMEDIATE 8
GOOD - DELAYED 17
DIATHERMY ADDED - AFTER 5 OR MORE DAYS OF MEDICAL TREATMENT
11 CASES
GOOD - I. 2
GOOD - DELAYED 7
DIATHERMY WITH INITIAL MEDICAL TREATMENT
14 CASES
GOOD - IMMEDIATE 6
GOOD - DELAYED 10
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
NUMBER OF PATIENTS

Fig. 2. — Graphic summary of results.

diathermy is incorporated in the treatment from the beginning the results are even more gratifying, because 6 of 14 patients had immediate improvement and 10 of the 14 had delayed improvement.

Comment

We realize that this series is too small to warrant any definite conclusions as to the value of short wave diathermy in the treatment of irritable colon. However, it would seem from the data that diathermy does have a

definite place in the treatment. Because of gratifying immediate and delayed results obtained in the group of patients treated initially with short wave diathermy and medical management, we now more or less routinely start with the combined treatment in cases of severe irritable colon. We are not yet in a position to state whether treatment is more beneficial given twice daily than once daily. Our results thus far reveal a slight but insignificant difference in favor of treatments twice daily. Analysis of the 7 failures to obtain relief revealed that 6 patients had a marked neurosis and cooperated poorly. We also observed in many of the cases not used in this report that a complicating organic disease may nullify the beneficial effects of diathermy. The seventh patient whose treatment failed obtained some improvement but not enough, in our opinion, to be classified as a satisfactory result. Nevertheless, the patient derived enough benefit so that when she had a recurrence of distress several months later, she returned to the hospital and asked for diathermy treatments.

Summary

Results of treatment of irritable colon with diathermy and medical management are presented as a preliminary report.

From our observations, diathermy is a beneficial adjunct in the treatment of irritable colon.

A larger number of detailed and controlled studies should be made before final conclusions are drawn.

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Discussion

Dr. Samuel Weiss (New York, N. Y.): I have enjoyed listening to the paper by Dr. Walter Zeiter, and I should like to say that because of neglect on the part of the medical profession, physical therapy has been exploited by cults but, no doubt, often with highly beneficial results both to the healer and to the patient. There are, however, obvious reasons why helpful methods of therapy should not be neglected by physicians and surgeons and relegated to the use of irregular practitioners.

Progress is being made in building up this branch of therapeutics. It is no longer necessary to see one's patient slipping away to irregular practitioners.

Although I am an internist I am interested in physical medicine in the treatment of gastrointestinal diseases. For some years I have not given treatments in my office but have referred the patient to a physician competent and well versed in physical therapy.

In treating the irritable or unstable colon all forms of colonic abuse (cathartics, enemas, irrigations) should be completely withdrawn and constipation should be treated by reassurance, relaxation and reeducation. The average patient seems to believe that the retention of waste matter in the body beyond one day is detrimental to health; that if the bowels fail to move every day he must do some-

(Concluded on page 471)

MODERN PHYSICAL THERAPY IN OTOLARYNGOLOGIC CONDITIONS FOR THE GENERAL PRACTITIONER

WALLACE MORRISON, M.D.

NEW YORK, N. Y.

If the average general practitioner who is up-to-date uses physical therapeutic apparatus at all, he probably uses either an infra-red generator, or a short wave diathermy apparatus or both. These are by far the most valuable and the most commonly used types. There is no question but that they can be helpful to the general practitioner in the treatment of many conditions which ordinarily would require the care of the otolaryngologist. There is no reason why he should not make use of them if he has the necessary knowledge. In what conditions are these modalities useful, and how may they best be applied?

Luminous heat is useful in the treatment of many acute and chronic conditions about the head and neck which cause discomfort or actual pain. Some of these are acute rhinitis, acute and chronic paranasal sinusitis accompanied with pain and headache, acute otitis media, acute and subacute mastoiditis, various types of neuralgia of the face and neck, myalgic headache, acute pharyngitis and laryngitis, acute tracheitis, and furuncles of the nose, face, ear or neck.

A nonluminous infra-red ray generator (long infra-red radiation) offers an abundance of heat and a minimum of light and is most useful when the short infra-red from luminous sources is objectionable, as when the face is being treated, the bright light may cause an unpleasant photophobia and blepharospasm unless the eyes are protected from the glare. In the treatment of otitis media in children, particularly, the glare may cause restlessness or seriously disturb sleep. For such conditions nonluminous sources of infra-red radiation are preferable.

These two kinds of radiation are used to obtain a mild, superficial local heating of the tissues. This will increase the circulation of local blood and lymph, stimulate tissue defense against infection, promote the activity of the mucous glands in the mucous membranes and thus enhance drainage and help relieve pain or discomfort by local sedation.

One must remember that it is a mild heat that is preferable in all treatments. The generator must be placed far enough away from the part to be treated, so that burns cannot occur; the treatment must be supervised constantly and the patient told to complain at once if more than a gentle and pleasant heat is felt. Hence one must be particularly careful in treating children, who cannot give such a warning. If a marked erythema or a superficial burn occurs the treatment should not be continued or repeated. Experience teaches that using short periods of irradiation of ten to twenty minutes every two or three hours, is the most efficient way to apply heat. The eyes should be covered with a cloth or damp cotton pledgets, and the pinna should be coated with petrolatum when the side of the head is being irradiated, to prevent burns.

The general practitioner and the specialist should always remember that physical therapeutic methods in general, and the application of heat or cold in particular, must be used in conjunction with and as an aid to the local treatment and general medication indicated. The use of a single modality will not secure the best results; disregard of signs of failure of the treatment, such as continued or additional symptoms, may actually expose the patient to danger. Thus one should make proper topical applications of

drugs to shrink the nasal mucosa in treating acute rhinitis and sinusitis, acute pharyngitis, laryngitis and tracheitis; give indicated medication for general effects, and, above all, avoid delay in providing necessary surgical intervention, e. g., myringotomy for acute otitis media, mastoidectomy for mastoiditis or irrigation for proper drainage of a sinus. Local application of heat is often successfully used to abort a middle ear abscess, surgical mastoiditis or acute frontal or maxillary sinusitis. When such treatment has been given a trial and symptoms increase in severity or new ones are added, with persistence of pain, fever and malaise, the withholding of surgical intervention in favor of more physical therapy, drug therapy or mere expectation of improvement from beneficial nature is unnecessary and unwise and may be dangerous.

Fig. 1. — Materials for the making of a nasal coagulation electrode point. A length of No. 50 drill rod is pointed with a file, curved with the fingers and insulated by dipping three times in a test tube containing household cement with a few drops of dark aniline dye for color.

The proper local application of heat after surgical drainage has been established is very important. Drainage will be promoted, unfavorable reactions diminished, and pain relieved, and the healing time will often be much shortened. Complications must be closely watched for and physical therapy abandoned in favor of further surgical treatment when the local and the general condition of the patient call for it.

Short wave diathermy offers a means of (*a*) applying controlled penetrating local heating for the relief of the pain and discomfort of the acute and sub-acute conditions for which infra-red radiation or luminous heat is used; (*b*) applying such heat in an endeavor to reduce suppuration and remove toxins by increasing the blood supply in the treatment of such chronic conditions as paranasal sinus infection, chronic rhinitis and pharyngitis, various forms of neuralgia and myalgia of the head and neck, catarrhal otitis media and nerve deafness and otosclerosis; (*c*) using the current in such concentration that it either coagulates tissues or splits them as with a knife (by the

cutting current) in the performance of so-called electrosurgery.

Short wave diathermy is particularly useful in treatment of disease about the head and neck because it can be applied so readily and is comfortable for the patient. The best method of application is the use of insulated circular plates 4 to 6 inches in diameter. These plates should be covered with rubber and protected by absorbent paper to insure cleanliness and to soak up perspiration. They should be separated from the part to be treated by sponge rubber, felt or glass. A convenient way of treating the pharynx and larynx is to use the insulated cable wound around the neck.

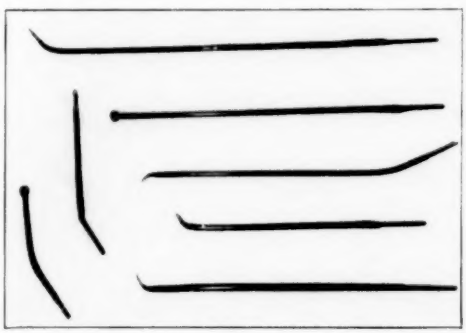

Fig. 2. — Nasal and pharyngeal coagulation electrode points, illustrating the various lengths, shapes, points, and ball points made with a drop of soft solder. All are insulated except for the point and 1 inch at the handle end to fit into the chuck.

Short wave diathermy must be used as one employs radiant heat or infra-red radiation. The utmost care must be used to prevent burns; the cables must be inspected frequently for breaks in insulation; proper spacing and covering of the plates or cable must be maintained. When short wave diathermy is used for the relief of pain, the production of a gentle heat is all that is required, and it is best used in periods of ten to twenty minutes repeated several times a day. As with other methods of heating, it must not be used except as an adjunct to other indicated methods of treatment. In acute conditions which need surgical treatment, if no relief is obtained after a short trial it is useless and its persistent use may be dangerous.

Short wave diathermy is also useful in the treatment of chronic conditions for which little can be done by other direct methods. It may help to relieve types of neuralgia which occur about the head and neck. It may aid in the relief of some of the chief symptoms in otosclerosis, chronic catarrhal deafness, nerve deafness and chronic hyperplastic sinusitis. In these chronic conditions, the heat is applied to the affected part daily or several times weekly for a half-hour; it should be used over a period of several months in very chronic forms of disease before it is abandoned.

Electrosurgical coagulation is useful in removing superficial blemishes on the skin, such as warts, moles, telangiectases and small angiomas; for the sealing of the bleeding point in the nasal mucosa in epistaxis; for the removal of nasal synechiae and the reduction of hypertrophied inferior turbinates; for the removal of nasal polyps and small benign growths and for the destruction in situ of infected faucial tonsils, tonsil remnants, lateral folds and patches of pharyngeal lymph tissue, the lingual tonsil, etc. The cutting current may be used to open bloodlessly furuncles and sebaceous cysts. The same current passed through a simple insulated nasal snare may be used to cut off pedunculated benign growths of the skin or mucosa, such as nasal polyps or papillomas.

For the coagulation of very small new growths anesthesia is not required. When the growth is larger or sensitive, procaine hydrochloride should be

injected. Ordinary surgical skill and cleanliness are the only requirements.

The uses of the cutting or coagulating currents in the treatment of disease within the nose or pharynx demand reasonable skill in the use of the head mirror and reflected light for proper illumination of the area. A working knowledge of the effects of the current is most easily obtained by using the current on raw meat before attempting to use it clinically. Without skill and proper though simple equipment, work of this sort should not be attempted by the general practitioner but should be referred to the otolaryngologist.

Local anesthesia is always necessary, since the mucous membranes are very sensitive. This may be readily secured in the nasal cavities, by application of a 10 per cent solution of alypin or cocaine or other similar surface anesthetic, on a cotton pledget until the area is entirely insensitive to pain. In the pharynx, the area may be painted four times at intervals of five minutes with small quantities of a solution of equal parts of cocaine or alypin powder in aniline oil and 95 per cent grain alcohol. This is a powerful surface anesthetic which must not be swallowed or used on the nasal mucosa. A 1 per cent procaine hydochloride solution may be injected into the area to be treated; before proceeding with the treatment one must wait for the edema caused by the injection to subside and for complete anesthesia to occur.

Fig. 3. — Hard rubber chuck handle for nasal and pharyngeal coagulating electrodes. The standard metal tip of the diathermy cable slips into the sleeve and is completely insulated thereby.

The surgical electrodes for use in the nose and pharynx are readily made from a No. 50 soft steel drill rod. The rod is filed to a point or rounded at the end, shaped with the fingers or nippers and insulated by repeatedly dipping it in a tube of household cement containing a few drops of a red aniline dye and allowing it to dry (figs. 1 and 2). These electrodes are used in a standard hard rubber chuck handle (fig. 3). Since the biterminal current is used the indifferent or dispersive electrode can be a large metal plate clamped around the bare forearm; or a metal nasal speculum or tongue depressor may be used if the second cable from the diathermy generator is

clipped or otherwise fastened to it. Heavy insulation and cumbersome apparatus are unnecessary because the ordinary 110 volt current used for lighting are all that are required for this work.

In the treatment of epistaxis, the bleeding point is anesthetized and lightly sealed by coagulation with a blunt-pointed electrode. Nasal synechiae may be removed by fully coagulating them with a pointed electrode and leaving the coagulum in place to act as a barrier to the reformation of the adhesion. Hypertrophied and obstructive inferior turbinates may be reduced in size by a submucous coagulation with a double needle electrode

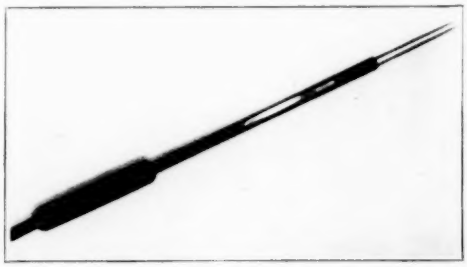

Fig. 4. — Double needle electrode in hard rubber insulation and handle for the submucous electrocoagulation of hypertrophied nasal turbinates.

(fig. 4), which may be purchased from the instrument maker. When anesthesia is complete this electrode is plunged into the submucosa and a mild coagulating current is passed until the tissue adjacent to the points of puncture turns white, when the current is shut off and the needles are withdrawn. The ribbon of coagulum so made turns into scar tissue in time and shrinks the thickened mucosa very well.

An electrode for the removal of nasal polyps and other benign pedunculated intranasal growths can be made by using the cannula of an ordinary nasal snare insulated with a piece of thin rubber tubing. The cable of one of the terminals of the diathermy machine can be clipped to the handle of the snare. After the snare has been placed around the pedicle of the polyps a coagulating cutting current may be passed through the wire and the mass cut off bloodlessly by slowing closing the snare. The operator should wear rubber gloves for his own protection.

Any or all of the lymphoid tissue structures in the pharynx can be removed by means of multiple puncture and coagulation with a suitable pointed electrode. Only a small area is treated at each session. The treatment must be repeated at weekly intervals until the lymphoid structure has been fully destroyed. Each treatment causes some pain and soreness and there may be minor or serious hemorrhage when the coagulum separates. This hemorrhage is readily controlled by the injection around the bleeding point of sufficient 1 per cent procaine hydrochloride solution to cause the tissue to balloon, followed by a mild coagulation in the area of the open vessel. One should not perform electrocoagulation in the pharynx unless ready to stop such hemorrhage when it occurs.

The chief advantage of this method over surgical removal of lymphoid tissue is that it is an office procedure, does not seriously interfere with the patient's work and is specially applicable when only small patches of tissue are to be removed. The disadvantages are that many treatments must be given over a considerable period if there is much tissue to be coagulated, there is recurrent soreness and there is a possibility of secondary hemorrhage. The treatment must be continued until all the tissue is gone, or the best results cannot be expected.

39 East Fiftieth Street.

GOUT — A PREVALENT ARTHRITIC DISEASE *

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and

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"The gout is so common a disease, that there is scarcely a man in the world, whether he has had it or not, but thinks he knows perfectly what it is and how it shall be cared for." So wrote William Cadogan in 1771 in his famous "Dissertation on the Gout."[1] During the nineteenth century, however, attention to gout declined to the point that by the twentieth century it was thought to be a rare disease, almost a curiosity. Medical teachers and clinicians lost interest, so that the diagnosis was seldom made. During the past ten years this disorder has aroused the attention of physicians in clinics in the United States, and the literature contains many references to its increased incidence. At the Cleveland City Hospital gout has been correctly diagnosed in 79 cases by the accepted criteria during the past five years, which would indicate that the disease is certainly not rare.

Gout as it is recognized today is not a new disease. Hippocrates is credited with the first description of gout as an entity. James Russell Lowell,[2] the poet, who was severely afflicted, commented on the derivation of the name. He said, "The disease derives its name from the patient's inability to *go out*, for the persons incident to the malady, are precisely those who themselves, or their ancestors for them, have kept just this side of the gutter." Lowell is not the only great man who suffered with gout; it would appear that no disease has had such a predilection for famous individuals. Alexander the Great and Louis the XIV of France were two outstanding rulers; among members of the medical profession, William Harvey, Widal, Linne and the great Sydenham had the disease, and many distinguished statesmen have been afflicted, among them Conde, Fox, Benjamin Franklin, the two William Pitts and, more recently, Neville Chamberlain.

The specific cause of gout is unknown although there have been much speculation and many theories. The most prevalent conception is that gout is a chronic disease of deranged purine metabolism, with its relation to uric acid. About one hundred years ago, Garrod detected an increase of uric acid in the blood of patients with gout, and it has since been considered an important and fairly constant sign of the disease. This uric acid which is excreted in the urine is derived from two sources; an exogenous source, such as the nucleoproteins in the food, and an endogenous source, chiefly the breakdown of the nuclear elements of tissue cells.

The exogenous source of uric acid is thought to be an increased intake of purine foods. This is usually associated with an excessive eating of meat, for which gouty patients have long been impeached. The majority of the 79 patients in this series were persons who were either on relief or whose income was so low that it was impossible for them to purchase much meat. Also, it is certain that many people partake of an excess of meat, and certain tribes and races are known to live largely on such foods without any great incidence of gout. It might be said that an excessive intake of purine is the predisposing cause for an attack in a person with gouty diathesis.

*Read at the Eastern Sectional Meeting of the American Congress of Physical Therapy, in conjunction with the New York Physical Therapy Society, the Pennsylvania Physical Therapy Association, the New Jersey Society of Physical Therapy Physicians, and the Connecticut Physical Therapy Society, New York, N. Y., April 5, 1941.

A possible cause for the increase of uric acid in the blood is the factor of diminished excretion by the kidneys, which may be due to pathologic conditions in the kidneys themselves or external changes which alter their function. The red, granular kidney has been found in gout and has been described and commented on since the time of Galen and has often been considered the etiologic factor. It would appear from the reports[3,4] that there is a greater incidence of chronic nephritis in gouty patients than in patients with other chronic diseases. However, opposed to the argument of renal damage as the cause of gout is the fact that in the larger percentage of gouty subjects granulation of the kidneys never develops, and, too, the majority of patients with chronic nephritis never have symptoms and signs of gout.

The interesting factor concerning the endogenous source of uric acid is its relation to the hemopoietic system. It was noted by investigators[5] studying pernicious anemia that potent extracts of liver which stimulated red cell production also increased the output of uric acid. Any agent which tends to stimulate the erythropoietic system becomes an important factor in the overproduction of uric acid and thus a potential etiologic agent for gout. There are also reports of gouty symptoms associated with polycythemia[6] and leukemia. Even the correlation between gout and lead poisoning may be explained by the fact that lead is an active hemolytic agent. Twelve of the patients in this series, some of whom were painters, were exposed to lead in some form.

Heredity has often been considered the important factor in the cause of gout. This opinion was accepted by the earlier writers, but in those days many rheumatic diseases were called gout, so that it was not difficult to find some member of the immediate family who had twinges and pains about the joints. In the American reports in which a sufficient number of cases are reviewed, a family history of gout was found to vary form 1 to 10 per cent.[7,8] The English authors[9] are more inclined to believe that a hereditary factor always is present. In this series of 79 patients from the City Hospital, about 10 per cent gave a family history suggestive of gout.

Many other causes for gout have been suggested, such as hepatic dysfunction,[10] meteorologic variations,[11] faulty fat metabolism,[12] vitamin B_1 deficiency,[13] allergy,[14] and neurologic imbalance.[15]

The classical picture of an acute attack is that of a white man about 45 years old, who is definitely overweight, has a temperature of 38 C. (100.4 F.) and is truly miserable. If the big toe is involved, it is swollen, purplish red and hot, and the pain is said to be almost unbearable, certainly worse than that of renal colic. The tenderness is most marked at the mesial aspect of the metatarsophalangeal joint. The swelling extends over the dorsum of the foot, which is cyanotic. A feature of the attack is the rapidity with which it appears. A patient goes to bed without any symptoms or signs and is often awakened during the night with the most severe joint involvement. The physical examination otherwise gives negative results. There are no tophi at this time, the blood uric acid is within normal limits and a roentgenogram of the toe is reported "normal." The usual course is that after two or three days the joint suddenly loses its swelling and pain and becomes normal.

This is a typical example of early or, as it is frequently called, presumptive gout, although there are variations. If the physician waits for the three classic signs of gout, he will miss most of the diagnoses. In a group of 40 cases reported[16] from the Mayo Clinic, an average of fifteen years had elapsed between the first medical attention and the establishment of the correct diagnosis.

The subsequent course in a typical case is that another attack occurs in two or three years, perhaps in the same joint. Usually the attack appears in the spring or fall. Between the attacks the patient is apt to be normal, with the affected joint presenting no evidence of previous attacks. The story is told of a man who was severely afflicted with gout and won an Olympic race during a remission. After several years of the disease the attacks became more and more frequent and other joints became involved. It is then that the blood uric acid level is raised and remains so and the tophi appear. Then roentgenograms of the joints, particularly those of the hands and feet, demonstrate the typical punched-out areas. The joints that have been the site of repeated attacks frequently become deformed and occasionally become ankylosed.

In analyzing these clinical features, it is found that this disease affects men almost exclusively. In the literature, percentages of 90 to 100 are given for the incidence in men. In this series there were 8 women and 71 men. The first attack usually occurs in the fourth decade. In this group the youngest patient was 25 and the oldest 76.

The big toe is the first joint involved in less than 50 per cent of the cases, but it is eventually involved, with pain and swelling, in all but 5 per cent. In this series approximately half of the patients had their first attack in the big toe and another 20 per cent had later attacks in this toe.

The touchstone in the diagnosis is the tophus, the pathognomonic sign of gout. Tophi appear most frequently in the ear or at least are most easily detected here. The periarticular tissues are also sites; tophi are thus found in bursae, most frequently in the olecranon, tendon sheaths, ligaments and subcutaneous tissues. They may be small, as in the ear, or comparatively large dimensions.

Roentgen signs suggestive of gout are the so-called punched-out areas which measure 5 mm. or more in diameter and are usually found at the base or the head of the phalanges. These areas are not to be confused with those seen in other arthritic conditions. They are not likely to occur until late in the disease. In 41 cases of this series roentgenograms of various joints were made. In 30 these were negative for characteristic punched out areas. The typical changes were demonstrated in only 11. Thus the roentgenograms in the majority of these cases were of no help in the diagnosis.

Treatment

The treatment of gout is relatively effective in comparison with that of the other forms of arthritis, and what is fortunate is the fact that it is dramatic if properly administered. During the acute attack the patient is kept in bed. Since the joint involved is exquisitely tender, a cradle is placed over the extremity to prevent even the weight of the bed clothes from resting on it. A small infra-red bulb may be suspended in the cradle, but this must not produce too much heat. Warm compresses are often used, though the frequent changes are apt to be intolerable. Plain water or magnesium sulfate compresses may be used. In Europe, mud and peat packs have been employed and have been recommended. Occasionally a patient will not tolerate the use of the infra-red rays and will secure relief by the use of cold compresses. A most appreciated measure is the use of a posterior splint which maintains the joint immobile. Thus the entire extremity may be moved or the patient may be changed in his bed without disturbing the affected joint. The diet during the acute attack consists of liquids, with no purine or fat. The medications most frequently used today are the alkaloid colchicine in doses of 1/120 grains (.0005 Gm.) every two hours until ten to twelve doses have been given or until signs of intoxication such as

nausea, vomiting or diarrhea appear. Acetylsalicylic acid or sodium salicylate and sodium bicarbonate are also given, in doses of 20 grains (1.29 Gm.) each every four hours, since it has been shown that the salicylates are excellent eliminants of uric acid. Cinchophen derivatives are not prescribed, since colchicine is of equal efficacy and is less toxic.

After the attack subsides, various factors are stressed in an attempt to control the disease. Since most of the patients are obese, an effort is made to decrease the weight. Thus a low calory diet of about 1,200 Gm., with a minimum of purines and fats is prescribed. In such a diet the patient avoids the glandular substances, such as liver, kidneys and sweetbreads. A minimum amount of meat, fish and fowl may be taken. Certain vegetables, such as spinach, mushrooms, peas, and beans and lentils, contain a greater amount of purine bases than others and should be taken in moderation. All other vegetables and all fruits may be taken freely.

Physical measures are employed to distinct advantage immediately after the acute attacks or during the chronic stages. Though the various forms of therapy for the acute attack will secure prompt relief in twenty-four to forty-eight hours, the involved joint will often be painful and stiff for several days or weeks. Afterward more active physical measures should be used to help absorb the exudation and prevent residual fibrosis. For this purpose heat in practically any form may be used, e. g. radiant heat lamps, paraffin baths, various warm packs, whirlpool baths and diathermy. Because many of these patients are obese, whose peripheral circulation is sluggish, the various types of baths may be employed to secure diaphoresis and to help eliminate waste products. A considerable variety are available, including hot air and the steam vapor bath and even the simple immersion bath. The electric cabinet bath is particularly helpful. A cradle with several lights suspended in it may be as effective and can be used in the home. The value of massage after the use of these forms of heat is obvious. Mennell, in his evaluation of massage, stated "that no man need have gout who can afford a slave, providing the slave is a skilled masseur." The use of all these measures may be prescribed regularly throughout the year.

Spa therapy is of inestimable value, but unfortunately it is seldom used in the United States. At all the famous European spas, the treatment of gout is featured. The advantage of the regimen at a spa is the possibility of strict regulation of the patient's diet and habits. The waters available at most spas are thought to possess certain physical properties which enhance the use of the baths, a claim which is questioned by several authorities; however, an undeniable fact is that the water used internally is a purgative.

Summary

Gout no longer is considered a rare disease. The diagnosis was made in 79 cases during the past five years at the Cleveland City Hospital.

The cause of gout remains unknown. Faulty purine metabolism, with its relation to elimination of uric acid, is still unexplained.

In the early stages a diagnosis of gout, which may be called presumptive, can be made by the typical clinical picture, whereas in the farther advanced stages the triad of tophi, elevated uric acid level and punched-out areas in the roentgenograms, will confirm the diagnosis.

Treatment includes several factors, with emphasis on a diet low in calories, purines and fats. The drug of choice is colchicine supplemented with acetylsalicylic acid and sodium bicarbonate. The judicious use of physical measures plays an important role.

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Discussion

Dr. Russell L. Cecil (New York, N. Y.): Dr. Solomon has stressed the fact that gout is a prevalent disease. I do not think a week passes that I do not see a patient suffering from gout. It is not often diagnosed — the average physician does not expect to see it and is not looking for it.

I have a physician friend who gets gout when he plays squash. Acute gout follows exercise or any excessive use of joints.

A diagnosis of gout should never be made when there is no history of acute gout. I believe that a joint disability which does not first manifest itself in acute attack cannot be classified.

It is a long way from the toe to the tophus, says Hench. The toe podagra occurs first, and after several months there is another attack in the toe. The tophus does not appear until a good many years later.

In diagnosing gout one should remember (1) that the joint will be swollen, purplish-red and painful; (2) that 90 per cent of patients with gout are overweight men past 40 (if gout develops in a young man, it is usually serious); (3) that there will be a history of overuse of alcohol; (4) that the roentgenograms are fairly characteristic and (5) that the therapeutic test with colchicine is of great value in doubtful cases.

I do not know of any more dramatic treatment than to give a patient suffering from acute gout an intravenous injection of colchicine and to see the swelling in the joint clear up in less than twenty-four hours.

In most cases, heat is effective; some patients, of course, prefer cold.

Cinchophen is widely used in the treatment of chronic gout; also rest, heat and a low purine diet.

The physician's problem is to prevent chronic gout from developing by giving the patient instructions concerning the diet, the bowels and the use of alcohol and impress him with the facts essential to the prevention of future crippling.

PHYSICAL THERAPEUTIC AIDS IN THE MANAGEMENT OF ALLERGIC CONDITIONS *

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Consultation, the sharing of responsibility in the treatment of serious conditions and the utilization of the knowledge of two or more physicians, makes the practice of medicine much pleasanter and more desirable. The result is, usually, that the patient is more adequately managed and realizes that the physician asking for consultation is a better physician because of his broad-mindedness. The wonder is that physicians do not call on their fellow practitioners for assistance more often.

This article presents the viewpoint of both the allergist and the internist on the use of the physical therapeutic agents which may be found of value in treating the allergic patient. It is the intention to take up each of the major allergic conditions and discuss briefly the physical agents which may be used to add to the comfort of the allergic patient. The allergist and the physical therapy physician may be said to occupy comparable fields. Probably neither produces a cure per se, but each does render such material aid to the patient — and nature — that the physiologic function may be restored and the patient's symptoms consequently relieved. Each of these fields is so intimately related to internal medicine that it cannot be entirely dissociated.

The antigen-antibody, or allergen-reagin, reaction is the most plausible theory to account for the allergic syndrome. The other theories have debatable points. Each case of allergy is an individual problem, and must be approached from the viewpoint of the diagnostician. An approach only by cutaneous testing is wholly inadequate. A complete and detailed history is essential. A complete diagnostic study, by every means available, is likewise essential. Correction of all abnormal conditions is even more essential for the allergic than for the nonallergic person. Only after the diagnosis is established is the physician ready to approach the problem from the standpoint of cutaneous testing, elimination and desensitization. By a diagnosis a complete diagnosis of allergic and nonallergic abnormalities is meant. The cutaneous testing should be a part of the detailed study of the recognized allergic state and should never be depended on for the recognition of that state.

The five conditions usually accepted as the major allergic diseases are hay fever, asthma, eczema, urticaria and migraine.

Major Allergic Conditions

Hay Fever. — 1. Seasonal: The patient with untreated seasonal hay fever suffers greatly; he suffers more than the laity and some physicians appreciate. Specific desensitization offers the most relief, but often he is not seen until the season of difficulty. What shall be done for him then? While he is in the office, open the blocked nose with butyn and ephedrine spray or a similar product. Then pack the nose gently — ever so gently — with 0.25 to 1 per cent solution of neosynephrine hydrochloride, and while this pack is in place apply infra-red heat. The infra-red irradiation alone may be sufficient to make the patient much more comfortable and permit sleep. Patients having infra-red lamps in their homes are instructed to use them freely, always under the supervision of the physician.

* Read at the Southeastern Sectional Meeting of the American Congress of Physical Therapy, Chattanooga, Tennessee, May 27, 1941.

If nasal blockage has been present a long time, the patient may suffer with headaches. Relief of the nasal blockage is, of course, of paramount importance. For the headaches the infra-red lamp or the short wave diathermy apparatus offers considerable relief in many instances. Short wave diathermy may be applied as directed for the sinuses. The mask adapted to fit the sinuses, the regular pads or cable electrodes may be used.

2. *Perennial*: For the sake of brevity, all conditions diagnosed as allergic rhinitis, vasomotor rhinitis, hyperesthetic rhinitis, etc., will be considered under this classification. Many of the patients have suffered with nasal blockage continuously for a long period and consequently have secondary infection in the sinuses for poor drainage, congestion and poor circulation. Short wave diathermy offers them even more than it offers patients with seasonal hay fever. Infra-red radiation likewise is a material aid. After nasal passages are opened they may be packed to advantage with a 10 to 20 per cent solution of mild silver protein (argyrol), and the physical agents mentioned may then be used. The use of heat, particularly diathermy, aids the circulation and tends to relieve the congestion and consequently is of material help in overcoming the presence of infection, and once drainage is established the patient is much more comfortable. One to three treatments daily with these physical agents may be necessary to give the greatest amount of relief.

Asthma. — For the purpose of this paper allergic and nonallergic bronchial asthma are included together under the general term asthma. All patients with asthma are entitled to careful allergic study and management, but often other measures are necessary to provide relief.

Some authorities feel that a toxic factor must be present in all cases of reflex bronchial asthma. Certainly it is true that some plan of detoxication is usually an aid. A simple detoxicating agent as a purgative is an aid to many patients. Physical measures which will aid in the elimination of toxic factors, by whatever means, e. g., sweat baths and colonic irrigation, may be used to advantage in the treatment of asthma. Many patients with long-standing asthma have varying degrees of bronchitis, bronchiectasis or emphysema. In treating them diathermy is of help. It enables them, apparently, to raise sputum with less effort. Theoretically, diathermy and fever therapy should be valuable adjuncts in overcoming the infection present.

Urticaria. — Acute urticaria rarely calls for physical therapeutic aids. One can understand, however, why physical agents may be of some assistance in treating the chronic types. Most chronic urticaria is due to chronic infection, to drugs or to foods taken regularly. When chronic infection is the cause, physical agents which promote detoxication or which tend to increase the general resistance of the patient may be used to advantage. Doubtless many physicians have used fever therapy for chronic urticaria.

Eczema, or Atopic Dermatitis. — "Eczema, or atopic dermatitis is the term usually employed to designate those inflammatory conditions of the skin, occurring in atopic individuals, resulting from intrinsic causes of a hemotogenous character." This is Tuft's definition, briefly stated. In treating eczema, then, as in treating all other allergic conditions, one should, first, remove the cause if possible; second, bring about some change in cellular or body metabolism which would render the hemotogenous agent nontoxic, and, third, stimulate the skin to acquire a more normal function. The allergist makes an attempt to locate the cause and eliminate it. An attempt is made to immunize, or desensitize, and thus change the cellular metabolism. Fever therapy would seem to accomplish the last two aims more nearly than any other physical agent.

It is recognized that in some cases of eczema roentgen therapy is of material aid. The results of ultraviolet radiation in the treatment of eczema are unpredictable. Some patients respond well, and the condition of some is definitely aggravated. It probably should not be tried in the treatment of the acute, weeping type of eczema.

In cases of very diffuse eczema, colloid baths, with oatmeal, give a great deal of temporary relief.

Migraine. — At present the meaning of the term migraine appears to be in a state of confusion. Many headaches which are not true migraine are diagnosed as migraine. Extreme care must be used in the diagnosis. The family history should be positive for migraine, the condition should manifest itself early in life and the cephalalgia must be irregularly recurrent, debilitating, usually unilateral and accompanied by nausea, vomiting, photophobia, etc., before the diagnosis is actually made. No physical therapeutic agents can be of any real help in the treatment of true migraine. However, physical therapeutic agents which tend to stabilize the sympathetic nervous system should help the average patient with migraine.

Physical Therapeutic Agents

There are two physical agents which, theoretically at least, may be of some assistance in the treatment of practically all allergic conditions: ultraviolet irradiation and fever therapy.

Ultraviolet Irradiation. — Tonic and supportive physical therapeutic agents may be used for all allergic conditions. It would appear, however, that they are needed most often in the treatment of perennial hay fever, long-standing asthma and chronic eczema. Patients with any or all of these three conditions often give the impression of being below par, and many actually have mild, secondary anemia. Repeated short series or more prolonged series of treatments with ultraviolet radiation are suggested for these patients. They have a great deal of chronic or recurrent infection of the respiratory tract through the fall, winter and early spring. Ultraviolet irradiation, combined with vitamin therapy, is a great help in increasing their general resistance and sense of well-being. Ultraviolet irradiation should be used more often, more consistently and more continuously.

Fever Therapy. — For some reason, the medical profession as a whole has been loathe to accept fever therapy for the treatment of any conditions except cerebrospinal syphilis and gonorrhea. If the results have been uniformly favorable in the treatment of other conditions, it is difficult to understand why this attitude should prevail. Reports of results with fever therapy in asthmatic persons have been appearing in the literature since 1930. In 1931 Leopold and Stewart[1] reported 7 cases in which the results were indifferent. Feinberg and Osborne[2] and Biancani[3] reported cases of asthma in 1932. Others have added their contribution in this field. Phillips[4] has been a pioneer, his efforts dating back to about 1928. He is still in favor of lower temperature ranges and treatments given two or three times a week.

In a personal communication Dr. J. A. McIntosh, of St. Joseph's Hospital, Memphis, Tenn., stated that Sister Philonilla had completed her 2,700th treatment with fever therapy without a fatality. This is a remarkable record. Of 29 patients with asthma and hay fever, 26 had shown improvement; the results in 3 were either indefinite or unknown. Of 19 patients with allergic eczema, 16 were improved; the results were indefinite in 1 and unknown in 2.

If the results of induced hyperpyrexia are consistently this good, allergists and internists should look carefully into the physical therapeutic field for adjuncts in the further management of their cases.

Comment

It would appear that the time has come, in fact is past due, when surgeons, internists and other specialists should realize that physical therapeutic agents may prove valuable adjuncts in the management of many conditions. They should develop a wider knowledge of what physical therapy may offer in their respective fields and apply these adjuncts. The patient will appreciate their use. Through all ages heat, baths and various physical agents have been used for the relief of human ailments. If their use has come to be looked on with some skepticism, or as some form of quackery, it must be because physicians have failed to recognize their scientific, psychologic or therapeutic values or have failed to use them in most instances in which physical agents offer most.

One of your members recently made the statement to me that the most adequate and modern physical therapeutic agents are now in the hands of chiropractors, operators of Turkish baths and operators of beauty parlors. This statement is probably true. If the ordinary man on the street feels that he must go to Turkish baths and beauty parlors to get the results these agents afford, it is a terrific indictment of the medical profession.

The lack of adequate equipment and of technicians capable of intelligently operating it acts as a deterrent to the use of physical therapeutic agents by many physicians. Nearly every physician, however, uses some physical agent, at least to a limited extent. In most large cities there are now to be found capable physicians who confine their work to the use of these agents, who know how to use them intelligently and who obtain therapeutic results. The desire of the physician at this time should be either to equip himself adequately, adding to his armamentarium adequate equipment to take care of his patients, or to ask the aid of the physician doing physical therapy in his immediate community.

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Discussion

Dr. Kenneth Phillips (Miami, Florida): It is refreshing to sit and absorb words of wisdom from a master in his own field. Seldom do we read such a thorough analysis of the value of physical agents in the management of such stubborn conditions. I agree with Dr. Owens that many allergic patients, regardless of their specificity, are persons whose general metabolism is low. His opinion that all measures which will benefit and improve metabolism should be reemphasized. Physical agents properly chosen will supply valuable adjuncts to accomplish this purpose.

In addition to allergic conditions he has logically called attention to the potential value of physical agents in other fields. Internists must soon begin to pay more attention to these potentialities if they expect to render up-to-date service in many medical problems.

Dr. Omar E. Smith (Memphis, Tenn.): As Dr. Owens has emphasized, a diagnosis must first be made before considering a therapeutic approach. From a pathologic viewpoint, one may consider irritation of the autonomic nervous system, smooth muscle spasm, mucous membrane and tissue edema and disturbance of reticuloendothelial balance. With this picture in mind, physical agents frequently offer the aid which is needed. The judicious application of heat and the use of other soothing agents is utilized to improve circulation, to bring about general relaxation and possibly to contribute to chemical changes such as decreasing the carbon dioxide content of blood and tissues, effecting the acid-alkali balance and further aiding systemic detoxification.

The apparatus selected will be dependent upon the clinical history of each patient. The application of short wave diathermy, sinusoidal currents, and the use of colonic therapy, fever therapy, iontophoresis and phototherapy are valuable aids in allergic conditions. They must, however, be chosen and applied with intelligence based upon training and experience.

Diathermy in Treatment of Irritable Colon — Zeiter and Renshaw

(Continued from page 456)

thing about it; that a large mushy stool or series of stools is normal and even beneficial; that the colon is a sewer, to be emptied as often and as thoroughly as possible; that the resisting period of the bowel which follows a thorough purging is a sign of constipation which can be cured only by more purging; that many common symptoms such as headache, fatigability and vertigo are best treated by cathartics or enemas.

In my experience I find that people who take cathartics because they think they are constipated weaken the autonomous bowel function and acquire increasing instability as time goes on. Not only does the nutrition suffer but often hemorrhoids develop. Rough foods and milk often increase colonic irritability and in many persons produce explosive, sour defecation and flatulence. Allergy may also be an important factor, especially in mucous colitis.

To sum up, patients with irritable or unstable colons should be treated according to the following method: Take time to explain that the constant use of purgatives or enemas is harmful; make an effort to gain their confidence and overcome their apprehension and insomnia by psychotherapy and the careful and judicious use of sedatives and somnifacients. Outdoor life, exercise such as golf or boating, change of scene and environment and physical therapy, including various forms of hydrotherapy, are useful. When pain is present rest and the use of belladonna are usually effective and exercise should be curtailed until the patient is free from pain. The diet should be bland, milk and cold drinks should be prohibited if they disagree or produce sour, mushy stools. Exposure to cold and wet should be avoided.

ROENTGEN THERAPY FOR INFLAMMATORY CONDITIONS OF THE EYES, EARS, NOSE AND THROAT *

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Roentgen therapy is beneficial and is indicated for many inflammatory conditions. The effects are caused not by direct germicidal properties of the rays but by indirect reactions created in the affected tissues. The primary reaction probably is transient vasodilatation, which may bring an increased volume of blood to the irradiated area. The most important action is the destruction of phagocytes, especially lymphocytes. These cells are especially radiosensitive. They carry antibodies to inflamed tissues and liberate them when the cells disintegrate under the influence of the rays. Thus, a local autovaccination takes place.

It is not the intention to describe in detail the technics used for the irradiation of inflammatory conditions of the eyes, ears, nose and throat. Different methods are used with equal success by many persons, but they all are of the theory that the objective is to destroy some of the white blood cells in a localized area; therefore, small and moderate doses of irradiation are given. Either radium packs or roentgen rays may be employed, as their biologic effects are similar. The choice between the two depends on their availability or ease of application or on personal preference and experience.

Intensive treatment is unnecessary, because for inflammations irradiation usually is administered to small areas and the white blood cells are destroyed by small amounts. If heavy irradiation is given, especially over bones containing considerable red marrow, the production of phagocytes may be interfered with. Most radiologists prefer to use low voltage and light filtration (0.1 to 0.2 mm. half value layer copper), administering from 50 to 100 roentgens per dose once or twice daily for a few days, or at intervals of several days, depending on the acuteness or chronicity of the inflammation and its response.

Within the past few years, low voltage short distance roentgen ray apparatus or contact therapy, as originally developed by Chaoul, has been useful for the treatment of many superficial inflammatory lesions, especially those of the eye, mouth, uterine cervix and others that may be made accessible by operative exposure. With this type of apparatus very large (8,000 roentgen units per minute) or small surface doses may be given in a few seconds. The depth dose is minimal, so that tissues underlying the lesion being treated are not damaged. This type of treatment replaces radium for many conditions and can be applied more easily and in minutes as compared to hours for radium therapy.

Perhaps the first and most striking beneficial effect of radiation therapy for inflammatory conditions is the prompt relief of pain, which often occurs in a few hours. After this subjective improvement, fever begins to subside, swelling is reduced and resolution takes place. The reactions depend on the stage of the inflammation at the time treatment is given. The best results are obtained when treatment is given early, preferably within twelve hours

* Read at the Nineteenth Annual Session of the American Congress of Physical Therapy, Cleveland, Ohio, September 3, 1940.

of onset. If necrosis is imminent or abscess formation has begun, the results are not so striking. When abscesses form before and during the course of treatment, drainage should be established surgically and irradiation should be given to hasten healing.

It would be impossible to discuss here all the inflammatory conditions of the eyes, ears, nose and throat for which roentgen therapy is indicated. Therefore, I shall mention a few for which the treatment often is not given sufficient consideration or is not employed at all.

The Eye

Radiologists sometimes hesitate to treat inflammations or other lesions of the eye because of the hazard of producing opacities of the lens. This may happen in children but seldom if ever occurs in adults except when heavy radiation is given, which is not indicated for the treatment of inflammations.

The pain of acute conjunctivitis is relieved and the course of the inflammation is shortened by small doses of roentgen therapy given daily for a few days, but the treatment should not be continued if it is unsuccessful. Chronic inflammations such as tuberculosis also may be benefited, but the treatment must be given in small doses over longer periods.

Vernal catarrah is being successfully treated by a few seconds of application to the everted eyelids with a bare glass radon bulb which emits a high proportion of beta rays. Contact therapy also may be used, small doses being given to the eyelids at intervals of a few weeks. The benefits from irradiation of this condition are not apparent for several months.

Chronic excessive lacrimation is very annoying and may be suppressed by heavy irradiation with either radium or roentgen rays localized over the lacrymal glands. The treatment should not be repeated too soon because the effects are slow to appear and the function of the glands should not be destroyed completely. In some cases the condition recurs in four or five months. Treatment may then be repeated if the reactions have not been too severe.

Entropion of the eyelids usually causes the eyelashes to come in contact with and irritate the eyeballs. Epilation doses of radium or roentgen rays may be given by limiting the irradiation to the palpebral margins with lead protection and similarly covering the eyeball. If and when the lashes grow long again, treatment may be repeated with caution.

The Ears

The eustachian tubes may be obstructed by hyperplastic lymphoid tissue which has developed from acute or chronic inflammation in the nasopharynx. This may result in temporary or permanent deafness, especially if the condition has existed long enough for fibrous tissue to have formed in or about the tubes. Otologists attempt to relieve the obstruction by repeated intubation, dilation and inflation. But no matter how skilfully this procedure is carried out, the tubes are repeatedly traumatized. This may cause scar tissue to form, gradually increasing the obstruction. If the condition can be recognized in the early stages, when only lymphoid tissue is responsible for the obstruction, roentgen therapy should be administered to the nasopharynx and the lymphoid tissue will disappear; thus, deafness may be prevented. However, the treatment seldom is beneficial in cases of chronic obstruction when considerable fibrous tissue is present.

Furuncles in the external ear canal are extremely painful because of the limited space between the bone, cartilage and epidermis in which the infection develops. Small doses of roentgen therapy should be given as soon

as the inflammation develops. Pain will be relieved, swelling reduced and the formation of abscess usually aborted. Chronic eczema and acute and chronic dermatitis of the ear canal also are relieved, but for chronic conditions of this nature treatment must be given in small doses at longer intervals and sometimes for one or two months.

Within the past few years there has been increasing interest in roentgen therapy for acute mastoiditis, which, if given early, may obviate the necessity for operation. Small doses are given once or twice a day for three or four days, depending on the progress of the condition. Chronic otorrhea following mastoid operations or other causes also is amenable to roentgen therapy. In many patients at the Cleveland Clinic who have had discharging ears for years without appreciable benefit from different types of treatment by otologists, the discharge has stopped after roentgen therapy. The improvement has taken place slowly, sometimes over several months.

The Nose

Furuncles in and about the nose, especially near the alae, are dangerous to life because the veins in this area drain into those at the base of the brain, and they have no valves. When furuncles in this location are incised or manipulated, infection often enters these vessels and is carried to the base of the brain, where inflammation is established from which death may result. Of 6 patients with this condition seen at the Cleveland Clinic within two years, 5 died from meningitis or intracranial abscess. All had had surgical incision of the furuncles. The 1 patient who survived was given roentgen therapy and manipulation was avoided. I am that survivor. But my conclusions about the efficacy of roentgen therapy for furuncles in and about the nose are not based on this case but on a number of cases in which treatment has been successful. At least, it should be strongly advocated that furuncles about the nose and upper lip should not be treated by surgical intervention.

The Throat

Within the past few years methods and instruments for the intraoral administration of roentgen therapy have been devised for either low or high voltages. Acute tonsillitis may be treated intraorally with considerable relief of pain and of the difficulty in swallowing. Although there has been controversy about the use of roentgen therapy for enlarged tonsils, nevertheless intraoral treatment is successful in selected cases. Large hyperplastic "lymphoid" tonsils will be reduced in size. But when there is considerable infection, the crypts are filled with debris, abscesses have been or are present and the tonsils are fibrosed, they should not be irradiated but should be removed surgically.

Benign laryngeal papillomas usually are multiple and usually are caused by chronic inflammation. When few are present they may be removed operatively, but they have a tendency to recur in increasing numbers. Also, when a great many papillomas are present complete surgical removal is difficult if not impossible. Roentgen therapy should be given rather intensively over the affected area by cross fire technics in moderate or heavy degrees. At the Cleveland Clinic the treatment has been found effective for children. In adults the condition is more resistant.

Inflammations of the salivary glands are definitely benefited by irradiation if given early. Pain will be relieved, swelling reduced and the formation of abscess prevented. The treatment is not so successful, however, if several days have elapsed before it is given. Parotitis, with inflammation of the other salivary glands, is not an uncommon sequala of intra-abdominal

operations, especially on the rectum, and the condition definitely increases the surgical mortality rate. When the inflammation is first recognized, irradiation should be given by radium packs or roentgen rays. The dosage is small and should be given once or twice a day and continued according to the severity of the inflammation and the results obtained. It has been proved that the treatment definitely reduces the surgical mortality.

Not infrequently salivary fistulas develop through accidental severing of the main ducts or by surgical incision for abscesses or calculi. Stensen's duct is most frequently damaged. These fistulas are troublesome because saliva drains from them almost continuously, but especially at meal time or from the odor of appetizing foods. Many operations have been devised to repair the ducts; however, almost invariably the fistula recurs, and it seldom is cured surgically except by extirpation of the affected gland. At the Cleveland Clinic roentgen therapy has been employed intensively in 7 cases of parotid fistula to suppress the salivary secretion long enough for the duct to heal. The treatment was successful in every case although in several, infection was present at the time of treatment. A second course of treatment was necessary in only 1 case. In these cases the fistula stopped draining in about ten days after the course of treatment was completed and the fistula healed. The patients had dry mouths for some weeks but the secretory function of the glands returned in about three to four months.

Conclusions

Roentgen therapy is successfully employed for many acute and chronic inflammations of the eyes, ears, nose and throat, the symptoms being relieved and the course of the disease being aborted in most cases. This treatment should be among the first therapeutic procedures given consideration and should not be withheld until the inflammation is in the late stages, when it will be less effective, but should be administered within twelve hours of the onset to obtain the best results.

THE EFFECT OF INFRA-RED IRRADIATION ON CUTANEOUS TEMPERATURES *

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and

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Comparatively speaking, little investigative work, particularly in regard to dosage, has been attempted concerning the infra-red end of the electromagnetic spectrum in contrast to the great volume of investigative work which has been done on the biologic, therapeutic effect and dosage of the ultraviolet portion of the spectrum.

Practically nothing has been done relative to the distance at which various sources of infra-red radiation should be spaced from the part to be treated. From the standpoint of the physical therapeutist, little is known as to the effectiveness of the reflectors of infra-red lamps or bakers.

It has been shown[1] fairly conclusively that the long infra-red rays are less penetrating and more irritating to the skin than the short infra-red rays. But, from a therapeutic standpoint, no investigative work has been done to indicate whether short infra-red radiation is more effective than long infra-red radiation. It has been shown[2] that a person can tolerate considerably more caloric output from a source of short infra-red rays than from a source of long infra-red radiation. Yet the nonluminous sources are used more extensively than are the luminous ones, which are the best sources of short infra-red rays.

The penetrative powers of the radiation from the infra-red region of the spectrum have been disregarded to a certain extent. This is probably true because the difference of penetration of tissues by these rays is only a matter of 3 to 5 mm., but it undoubtedly is the difference between penetration to the capillary bed on the part of near infra-red rays and penetration of the epidermis with superficial irritation on the part of the far infra-red rays.

If superficial heat and irritation are all that are needed to increase circulation in the deeper regions, perhaps the conductive heating methods are as effective as the mild penetrative heat rays of the light source. In this case, then simpler conductive methods of heating, such as the electric pad, hot pack, hot water or paraffin pack, are probably as effective as the light source.

It has not been emphasized sufficiently that only the direct rays of a heat lamp are penetrative and that most reflectors probably concentrate the heat only in small regions. Therefore these lamps often are used with the intention of treating large regions when actually only a small portion of the body is receiving adequate heating.

In regard to diathermy, it has been found that,[3] after a certain period of heating, the tissue temperatures drop, indicating that circulation is increasing sufficiently to dissipate the heat from the tissues more rapidly than it can be generated within them. This may be true also of radiant energy.

With some of these problems in mind, it was decided to attempt to ascertain whether a definite means of determining dosage for the radiant heat lamp could be developed and under what circumstances the lamp could be

* Read at the Eastern Sectional Meeting of the American Congress of Physical Therapy, New York, April 5, and the Mid-Western Sectional Meeting of the American Congress of Physical Therapy, Madison, Wisconsin, April 16, 1941.

employed effectively for therapeutic purposes. Elevation of the cutaneous temperature was chosen as a means of measuring the amount of surface heating of the tissues.

This report deals with the results obtained in regard to cutaneous temperatures when radiation from luminous heat lamps was applied under ideal conditions to the skin of normal persons. While the data are of practical value as far as the heat lamp is concerned, much more investigation must be done to clarify the results. The subjects were young, healthy, normal persons, one woman and two men. All the studies were conducted in a constant temperature room, which was maintained at 25 C. (77 F.) with a maximal variation of not more than ± 0.5 C. (± 1 F.). The relative humidity was 40 per cent.

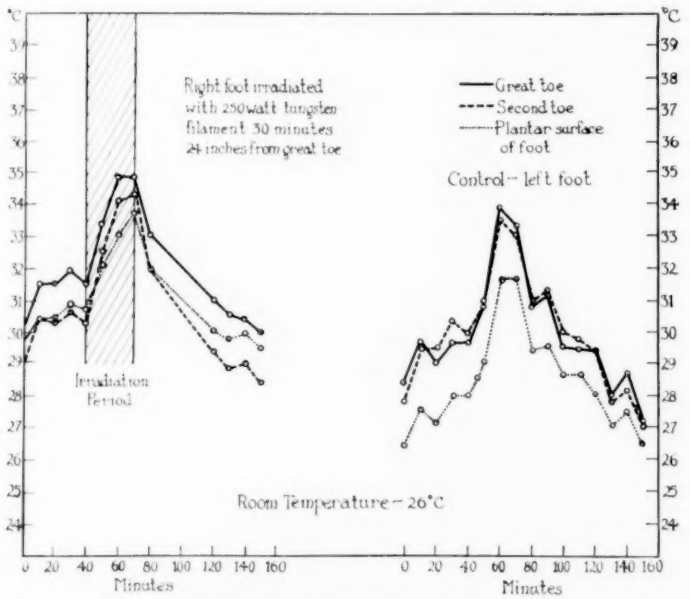
°C
°C
Right foot irradiated with 250 watt tungsten filament 30 minutes 24 inches from great toe
Great toe
Second toe
Plantar surface of foot
Control – left foot
Irradiation Period
Room Temperature – 26°C
0 20 40 60 80 100 120 140 160
Minutes
0 20 40 60 80 100 120 140 160
Minutes

Fig. 1. — Effect of infra-red irradiation of the foot on cutaneous temperatures.

The cutaneous temperatures were determined by means of the electromotive thermometer described by Sheard.[4, 5] Each thermocouple, lying on the face of a thin layer of cork in a button of bakelite, was fastened in position on the body by a narrow strip of adhesive tape. The terminals of the thermocouple leads were plugged into copper-constantan receptacles. Ten thermocouples, each with leads of constantan and copper wires of 8 feet (244 cm.) respectively, were operated from one bank of connecting switches. The deflections of the galvanometer were calibrated to indicate equivalent degrees centigrade. This instrument enabled the observer to obtain cutaneous temperatures rapidly and with an accuracy of about 0.2 C. (0.4 F.).

The subject used was fasted for at least six hours and was in the room for sixty to ninety minutes before the study was started. Thermocouples were applied, as recorded in the graphs, to the areas to be irradiated and to corresponding areas for control. Readings of cutaneous temperature were taken every ten minutes for a period of forty to sixty minutes or until the resting temperatures became comparatively stable. The part then was irradiated for intervals of thirty minutes or more with a 250 watt tungsten filament lamp in the usual concave reflector and spaced at various distances.

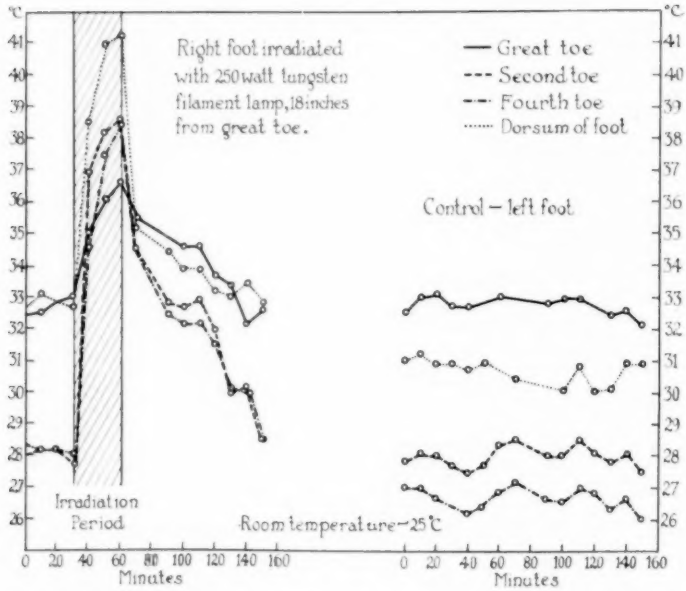

Fig. 2. — Effect of infra-red irradiation of the foot on cutaneous temperatures.

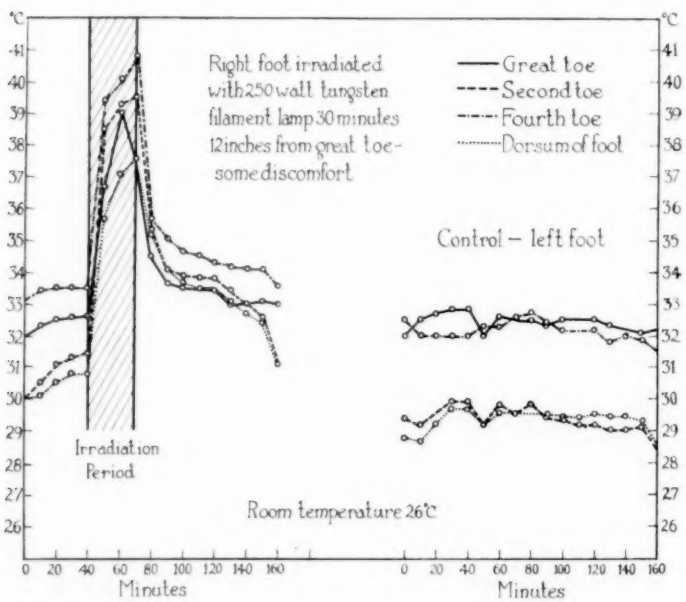

Fig. 3. — Effect of infra-red irradiation of the foot on cutaneous temperatures.

During irradiation, readings were made every ten minutes. After the lamp was removed, readings were continued until the cutaneous temperatures had returned to or near to the original level.

The lamp was placed 24 inches (61 cm.) from the great toe. This is the distance often recommended for the spacing of a lamp from the part to be

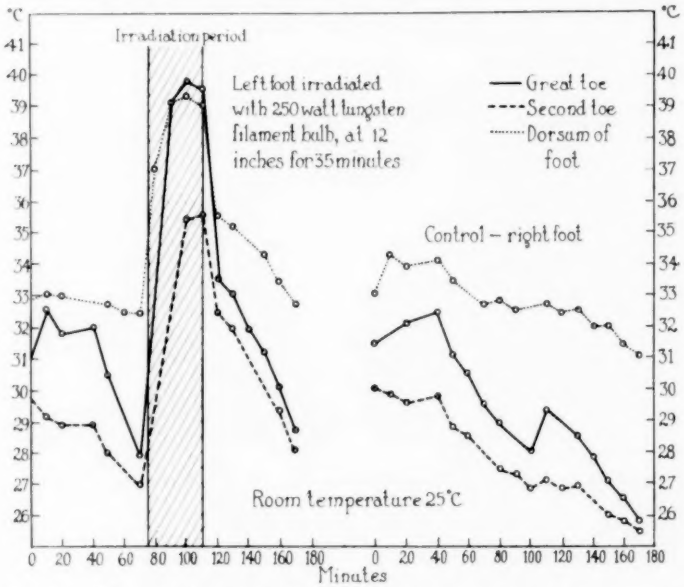

Fig. 4. — Effect of infra-red irradiation of the foot on cutaneous temperatures.

treated. As shown in figure 1, the cutaneous temperatures rose only to 34 or 35 C. (93 or 95 F.). The cutaneous temperature of the control foot simulated very closely that of the irradiated foot. Since this did not occur in any other series of observations, it is assumed that in this instance the control foot was not shielded properly from the light. When the lamp was 18 inches (46 cm.) from the part (fig. 2), the cutaneous temperatures were considerably higher than when it was 24 inches (61 cm.) from the skin. The temperature of the dorsum of the foot was much higher than that of the great toe. Irradiation of the foot with the lamp at a distance of 12 inches (30 cm.) from the surface produced the effects shown in figures 3 and 4. The cutaneous temperature rose to levels as high as 41 C. (105.8 F.) and there was slight discomfort. The dorsum of the foot had the lowest temperature in one instance (fig. 3), and the second toe had the lowest in the other (fig. 4).

The knee was irradiated at distances of 18, 16, 14 and 12 inches (46, 41, 36 and 30 cm.). Thermocouples were placed on the medial, lateral and patellar aspects of the knee. The thermocouples were also placed at identical points on the other knee, as well as on the middle finger of each hand and on the dorsum of each great toe.

The normal level of cutaneous temperature of the knee was higher than that of the foot. With irradiation of the knee, the rise in cutaneous temperature was higher than that obtained in the foot. The elevation of the cutaneous temperature varied. If the original temperature of the skin over the knee was low, the temperature reached under irradiation was not as great as when the initial temperature was high; but the number of degrees of elevation was about the same.

It will be noted in figures 5 and 6 that at 18 inches (46 cm.) the cutaneous temperatures of the knee were elevated to 39 and 40 C. (102.2 and 104.0 F.);

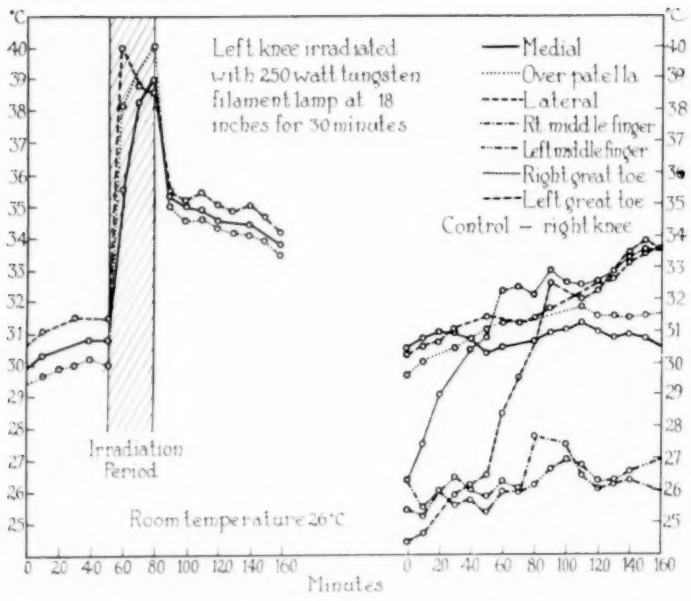

Fig. 5. — Effect of infra-red irradiation of the knee on cutaneous temperatures.

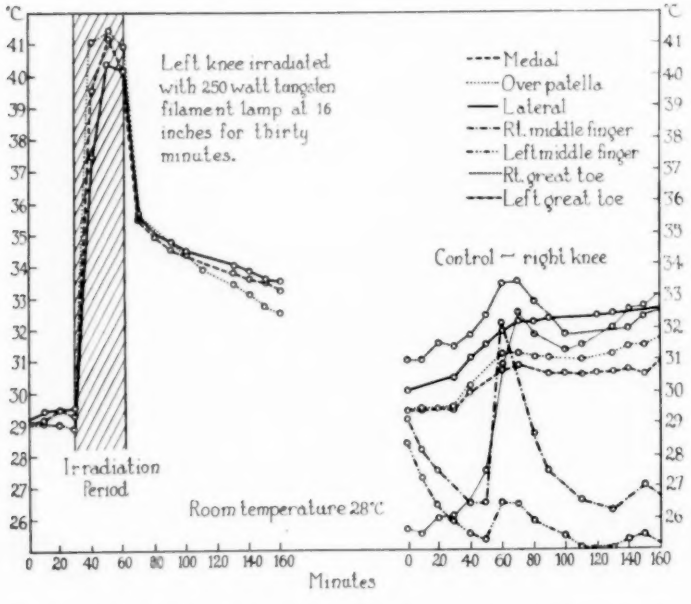

Fig. 6. — Effect of infra-red irradiation of the knee on cutaneous temperatures.

at 16 inches (41 cm.), the elevation was about 1 C. (1.8 F.) higher; at 11 inches (36 cm.) (fig. 7), the elevation was about the same as at 16 inches, and at 12 inches (30 cm.) on two or three occasions the cutaneous temperatures were elevated to levels as high as 42 or 43 C. (107.6 or 109.4 F.) without discomfort to the patient and with the production of good hyperemia.

Since shielding would tend to retain the warmth of the surrounding air and to eliminate cross air currents, it was decided to try shielding of the

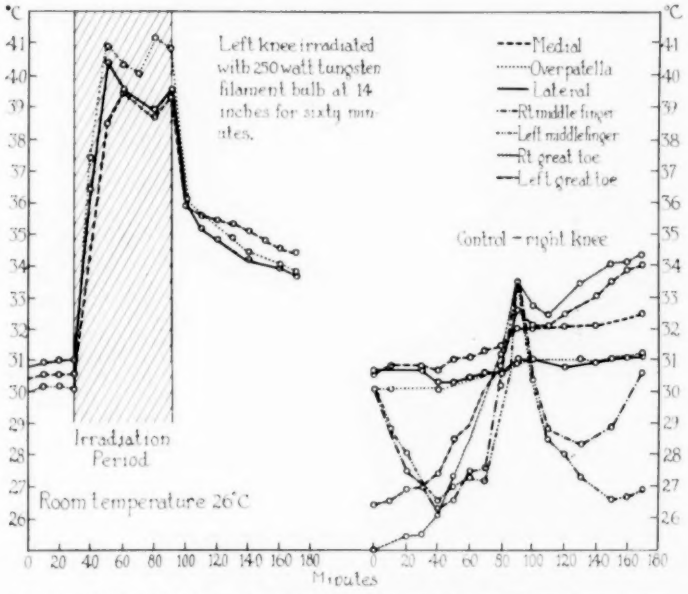

Fig. 7. — Effect of infra-red irradiation of the knee on cutaneous temperatures.

lamp and part during irradiation. Therefore, a woolen blanket was placed around the lamp and the part of the body to be irradiated. When this was done, the elevation of the cutaneous temperature of the foot was increased 3 to 4 C. (5 to 7 F.) above that obtained without shielding. The lamp, while shielded by means of the blanket, was used at various distances over both the knee and the foot.

Figures 2 and 8 indicate the differences in the elevation of cutaneous temperatures of the foot when the lamp was placed at a distance of 18 inches (46 cm.) from the part and when the part and the lamp were shielded in one instance and not shielded in the other. With shielding, the elevation of cutaneous temperature was 4 to 5 C. (7 to 9 F.) greater. On irradiation of the knee when there was no shielding, the cutaneous temperatures showed less variation in elevation with changes of distance than on irradiation of the foot. However, if the lamp was shielded, when it was spaced 18 inches (46 cm.) away from the foot, the elevation of the cutaneous temperatures was about the same as if the unshielded lamp were applied at a distance of 12 or 14 inches (30 or 36 cm.).

Figure 9 indicates the elevation of cutaneous temperatures of the foot when the lamp was placed at a distance of 12 inches (30 cm.) from the foot and the lamp and the foot were shielded.

It was noted in all the studies that it required at least twenty minutes for the cutaneous temperatures to reach the maximal elevation. After twenty minutes, the temperatures reached a maximal level or began to drop. When the part was heated by means of the lamp for one hour as indicated in

figure 7, the cutaneous temperature rose to the maximal height in twenty minutes, dropped about 1 C. (1.8 F.) in forty minutes and rose again at the end of an hour to about the original level. This would indicate that maximal vasodilatation is reached at the end of about thirty minutes, and that, with this maximal dilatation, there is sufficient circulation of blood to dissipate the heat temporarily at a faster rate than that at which heat is absorbed by the tissue under radiation. This causes the transitory reduction of the cutaneous temperatures. With continued heating this vasodilatation is not sufficient to maintain the cutaneous temperatures at lower levels. In this par-

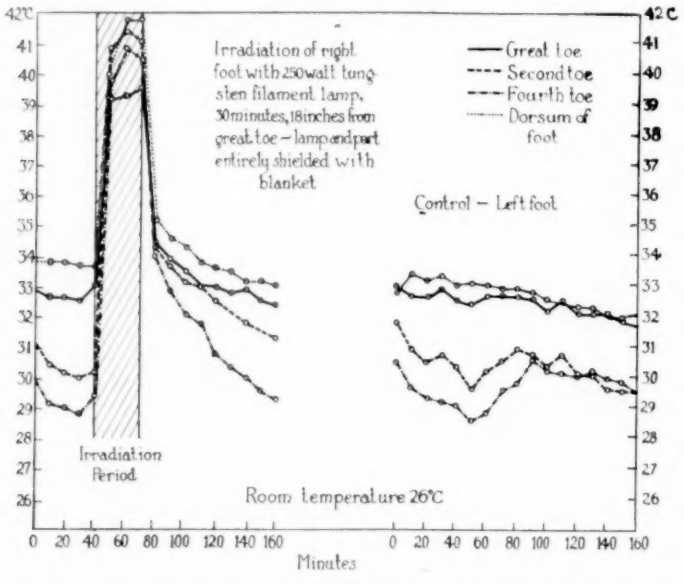
Irradiation of right foot with 250 watt tungsten filament lamp, 30 minutes, 18 inches from great toe – lamp and part entirely shielded with blanket
Great toe
Second toe
Fourth toe
Dorsum of foot
Control – Left foot
Irradiation Period
Room temperature 26°C
Minutes

Fig. 8. — Effect of infra-red irradiation of the foot on cutaneous temperatures when the lamp and the foot were shielded with a blanket.

ticular study (fig. 7), the cutaneous temperatures remained much higher than usual after the irradiation had been discontinued.

In one instance (fig. 10), a woolen blanket was placed over the foot after the cutaneous temperatures had reached a fairly stable level. The cutaneous temperatures of the part were elevated about 2 to 4 C. (3.6 to 7.2 F.). The maximal elevation was about equal to that obtained by use of the unshielded heat lamp over the part at a distance of 24 inches (61 cm.) (fig. 1).

In the study in which the blanket was used for covering (fig. 10), the part was heated by means of a tungsten filament lamp at a distance of 18 inches (46 cm.) for forty minutes. The elevation of the cutaneous temperature was a little higher than usual at that distance, namely to 40 C. (104.0 F.). After the heating was discontinued, the part was covered with a blanket and the temperature of the skin remained very near that of the body, namely 36 to 37 C. (96.8 to 98.6 F.) or 2 to 3 C. (3.6 to 5.4 F.) higher than it was prior to the heating. From a practical standpoint, this indicates that possibly one should cover the part which is to be massaged after the use of heat at least until massage is begun.

There was some indication that in persons receiving radiant heat treatments repeatedly a tolerance for the heat developed and after several treatments persons could withstand applications of the lamp at closer distances. Likewise, there was some suggestion that after several treatments the cutaneous temperatures remained at a lower level, even though more heat

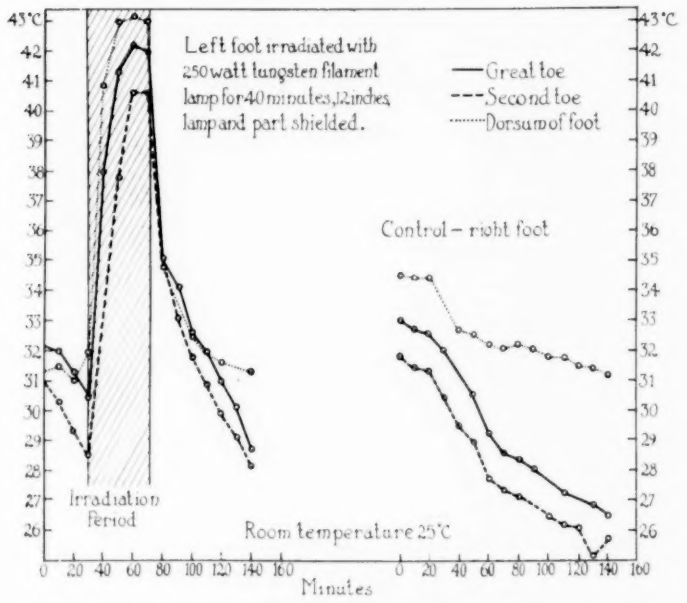
Left foot irradiated with 250 watt tungsten filament lamp for 40 minutes, 12 inches, lamp and part shielded.
Great toe
Second toe
Dorsum of foot
Control – right foot
Irradiation Period
Room temperature 25°C
Minutes
°C

Fig. 9. — Effect of infra-red irradiation of the foot on cutaneous temperatures when the lamp and the foot were shielded with a blanket.

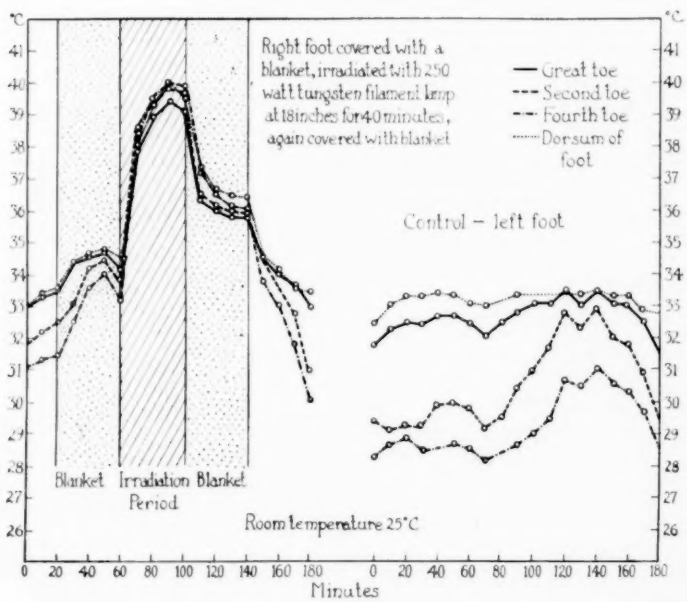

Fig. 10. — Effect on cutaneous temperatures of covering the foot with a blanket and of infra-red irradiation.

was being applied. This would suggest that circulation had been improved and dissipation of heat increased by the repeated applications of infra-red radiation.

A few studies were made in which the part was irradiated by means of an infra-red carborundum unit in an ordinary reflector. These studies indicated that the lamp containing the carborundum unit had to be farther away from the skin than did lamps containing luminous units. The elevation of cutaneous temperatures when the lamp containing the carborundum unit was employed at 16 inches (41 cm.) from the foot was 2 to 3 C. (3.6 to 5.4 F.) less than the elevation obtained when the luminous source was used. Even at these lower temperatures, the carborundum unit produced considerable discomfort.

Conclusions

These studies indicate that heat lamps in general should be applied at shorter distances than is customary. Most luminous sources can be employed at a distance of 14 to 18 inches (36 to 46 cm.). It is possible that in certain diseases the circulation of blood is not sufficient to allow the lamps to be applied quite so closely as is possible in normal persons. It seems undoubtedly to be true that the lamps should be used for periods greater than the customary fifteen or twenty minutes, because in most instances the maximal elevation of cutaneous temperature is not reached until twenty minutes have elapsed and the temperature does not level off until after about thirty minutes.

It would seem that treatment would be more effective if shielding of the lamp and part were employed. These studies indicate that, with shielding, the cutaneous temperatures may be elevated as much as 3 to 5 C. (5.4 to 9 F.) above those obtained when no shielding is used. The use of heat followed by massage may be more effective if the part is covered immediately after the heating period in order to maintain the elevation of cutaneous temperatures until massage is begun. If it is true that, with repeated treatments, increased tolerance to heat develops owing to the fact that there are greater vasodilatation and more dissipation of heat, then the distance of the source from the part should be lessened as the number of treatments is increased.

More investigative studies should be performed in order to determine the effectiveness of reflectors as far as the size of the region covered by the radiation is concerned. Also, the differences in the actual energy output with the various sources should be determined in relation to the reflector, the source and the distance of the lamp from the part.

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Discussion

Dr. William Bierman (New York, N. Y.): The type of investigation presented by Dr. Elkins is of value as a guide in the clinical applications of radiant energies. Sonne, Bache, Anderson and others have conducted investigations as to the penetrative effect of these energies. Their conclusions indicate that radiations in the red end of the visible spectrum and the near infra-red (i.e. wavelengths shorter than 14,000 A) penetrate through the epidermis and dermis into the subcutaneous tissues. Determinations of temperature which we have made show the greater penetrative power of lamps whose radiations are rich in visible and near infra-red wavelengths as contrasted with those whose wavelengths are predominantly in the portion of the spectrum beyond 14,000 A. With the latter, it is possible to obtain higher cutaneous temperatures. Dr. Elkins calls attention to the fact that he was able to obtain higher temperatures in the region of the knee than in the toe. This is in accord with our observations which showed great variations in the capacity of different parts of the cutaneous surface to tolerate heat. The extent of that toleration appeared to be in inverse ratio to the actual temperatures achieved.

The possibility that a percentage of the radiation does not come away from reflectors in parallel fashion and that therefore "hot spots" may be created is of clinical importance. It does indicate the need for further improvement in reflectors. For many years we have made use of 1500 watt tungsten filament lamps with satisfactory results. It may well be as Dr. Elkins indicates, that by means of better reflectors these lamps can be made to be more efficient.

Dr. Norman E. Titus (New York, N. Y.): Dr. Elkin's work in estimating skin temperatures is of great interest to all who look upon photothermy as a precise procedure. Clinically, however, the heat generated beneath the skin is of more interest than the heat formed on the skin. Thermocouple experiments to show the temperature down deep in tissue would be of greater clinical interest. The effect obtained from light in treatment is not the counterirritation caused by heating the skin but the subdermal illumination where the tissues stop the energy and are heated.

The results obtained by Dr. Elkin in shielding the light were to be expected. As I understood his method, a towel is placed around the reflector, extending down to the patient's skin. This really forms a chamber of high humidity and hot air, so that one would expect more heat on the skin. The int resting resul: has no great clinical significance, because heating of any part in a hood containing light bulbs should never be done unless free circulation of air is allowed. If perspiration is not allowed to evaporate and cool air to go into the chamber, sweat will accumulate and burns may result.

I have seen electric light bakers, as they are called, that had the enamel on the outside burned off because of the extra heat that was kept in by blankets that had been placed over them.

Fracture cradles with a lamp underneath should never be completely covered with blankets. This is the usual procedure, however, of nurses and physicians who know nothing of the correct application of photothermy. The circulation of fresh air under these hoods is of the greatest importance.

Infra-red radiation in the region of 14,000 and 18,000 angstrom units has great penetration. It is these wavelengths that create clinically useful subdermal heat. There are wavelengths in the visible spectrum that also penetrate beneath the skin. If visible light did not penetrate through the skin, otolaryngologists could not do transillumination, and if one sits on the sunny side of a train with the shade pulled down, one can feel the infra-red rays that penetrate through the shade.

I am afraid it is sometimes forgotten that it is the deep action of light that is useful and often better than diathermy.

Dr. Nathan Goldstein (Brooklyn, N. Y.): A little over a year ago, Mr. Braestrop, who is a physicist for the Department of Hospitals of the City of New York, and I asked a number of manufacturers of therapeutic lamps to submit them for testing. These lamps were focused on a table 3 by 3 feet at a distance of 30 inches, and by means of a photoelectric cell and a galvanometer we were able to determine where and how many "hot spots" were focused on the table. No two lamps, even from the same manufacturer, created the same "hot spots," because there are a number of variables, such as slight deviation in the reflectors, placing of sockets in the lamp and the filament of the bulb itself.

It is therefore understandable why Dr. Elkins received variable results. As to Dr. Bierman's remarks that the results may not be so bad, because burns are rare, I feel that the rarity of burns is due to the fact that lamps are usually used at the distance of 30 to 36 inches. If they were used as in the experiment, at 16 inches, I am positive burns would be common, particularly if there were any anesthesia of the skin.

MODIFICATIONS AND EFFECTS OF THE STATIC SURGE AND OF THE STATIC WIRE-BRUSH DISCHARGE

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and
JANET TRAVELL, M.D. *

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In 1923 one of the authors[1] reported two new hook-ups for the static machine which yielded modalities designated, respectively, the static surge and the static wire-brush discharge. Since then we have modified these technics in a manner which has simplified their application and perfected

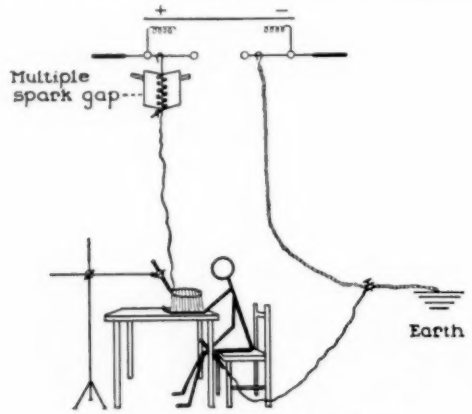

Fig. 1. — Static wire-brush discharge.

their control. In this report we shall describe these improved procedures and indicate their field of usefulness.

Static Wire-Brush Discharge

The hook-up for this modality (fig. 1) involves the following points: The terminal balls of the static machine are widely separated. The negative pole and the patient are grounded. The discharge, consisting of a violet spray, is delivered to the patient by a specially prepared wire electrode connected with a multiple spark gap, which in turn is connected with the positive terminal of the apparatus.

The multiple spark gap may be of any convenient type, made with balls, points or disks, and with a variable number of interruptions, preferably six to ten. Its construction should be such that the distance between the points can be varied at will. Close spacing yields a fine, soft spray similar to the de Kraft blue-pencil brush discharge, while wider spacing produces a coarse prickling spray. The fineness or coarseness of the spray varies also with the number of spark gaps. We have constructed our own multiple spark gap as follows: Small brass balls are set on wooden pegs which have been boiled in paraffin, or on hard rubber pegs, and are arranged in two rows in a movable frame so that the distance between the opposing balls may be increased or decreased as desired.

The wire electrode is composed of a non-conducting handle, usually made

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of hard rubber, to which is permanently attached a wire of suitable size and length. A No. 12 soft brass wire or a multiple strand galvanized wire of slightly larger size may be used; the wire must be stiff enough to retain the

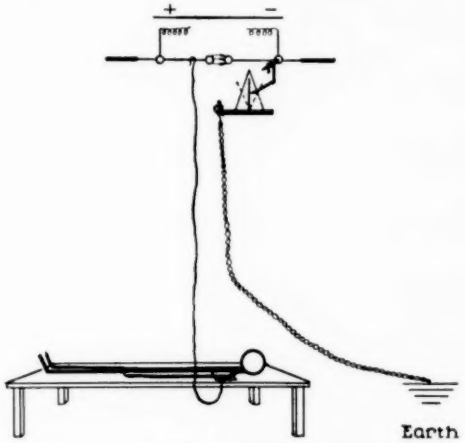

Fig. 2. — Static surge.

shape and position in which it is set, and sufficiently pliable to permit moulding to the body contours. The wire is thoroughly coated with shellac (French varnish) through which the static discharge is passed before the shellac becomes dry and hard. It is convenient to have at hand several such electrodes with wires of different lengths, sizes and configurations. The wire may be bent in the form of a loop, narrow or wide, long or short, regular or irregular, and moulded to conform to the curves of the part to be treated.

A properly prepared wire electrode needs no further attention for years and is always ready for use. This is an advantage which will be appreciated by those who have difficulty in keeping the correct degree of moisture on the wooden stick used for delivery of the de Kraft blue-pencil brush discharge, which this current supersedes. The multiple point electrode supplied with the static machine may be substituted for the wire electrode, but it has the disadvantage that it is inflexible and covers only a small area.

Certain other details of technic require mention. The static machine should be operated to give a low output of current. If it is run at too high a speed, the electrode may throw sparks instead of a smooth spray. At the outset, all connections are made with the terminal balls in contact; on starting the treatment the balls are quickly drawn apart. When making adjustments which require handling the electrode, the balls must again be brought in contact. The discharge should not be delivered through clothing. The duration of treatment is usually 15 to 20 minutes.

An attractive feature of this form of current is that after proper adjustment, the electrode may be fixed in position by means of a stand or clamp and the treatment allowed to proceed without close attention of the operator. The electrode is seldom held in the hand during the treatment. As a precaution and to reassure the patient, he is always informed that the current will automatically cease if he moves away from the electrode.

This hook-up differs from the one previously described[1] in that the patient is now grounded. One result of this modification is a reduced tendency for sparks, harmless but annoying, to pass from the electrode to the patient. Another advantage is that the operator may touch the patient with impunity and make certain readjustments without stopping the treatment. Furthermore, the use of an insulated platform is rendered unnecessary; any

chair or couch will serve. So far as we know, these last two conditions are contrary to those which obtain in the customary use of all other static modalities.

The wire-brush discharge has a striking effect in relieving pain. We employ it in all conditions in which we formerly used the de Kraft blue-pencil brush discharge. It can be used without any ill effects and with great benefit in the most acute types of neuritis and neuralgia. It will to a large extent relieve pain due to fibrositis or "trigger points" in muscles, provided the affected muscle is not too deeply located beneath the body surface. It is helpful in reducing swelling due to tenosynovitis and sprains. It will hasten the disappearance of traumatic ecchymosis, as in the case of a "black eye."

The application of this spray produces hyperemia of the skin in a variable length of time (10 to 30 minutes), depending on individual sensitivity and on the coarseness of the spray. The coarser the spray, the more rapid the appearance of hyperemia, which may persist for several hours. A beneficial result may be obtained, however, even in the absence of visible hyperemia. If the spray is applied repeatedly to a given area, tanning of the skin may result, as after exposure to ultraviolet light. This current does not produce any perceptible contraction of muscle groups as a whole, but a fibrillary twitching may be noted when a coarse spray is used.

The mechanism of action of this high voltage discharge has not been demonstrated. At the present time it is speculative as to whether its effects are due to hyperemia and increased blood flow in the deeper tissues, to improved lymphatic drainage, or to changes affecting the electrolytes or ionic charge of the structures.

Static Surge

It should be noted that in the hook-up of the static surge modality (fig. 2) the terminal poles of the machine are separated a relatively short distance, that is, only so far as the patient's tolerance will permit. A continuous flow of sparks passes between the terminals. The positive pole is connected with the patient by a metal plate and insulated wire as in the hook-up for the Morton wave current. The patient sits or reclines on an insulated platform, and is not grounded. The negative pole of the machine is grounded through a metronome. The pendulum of the metronome swings in proximity to a metal extension from the negative pole in such a way that a rhythmic "make and break" in the current is produced and a discharge of gradually increasing and decreasing, or surging, intensity is delivered to the patient.

A convenient arrangement which achieves this result is as follows: An ordinary metronome is placed on a metal plate or shelf beneath the negative pole, with its metal parts well grounded. A rigid brass rod, about 3/8 inch in diameter and preferably half round, is fastened securely to the negative terminal, and extends vertically downward to a point opposite the upper third of the pendulum of the metronome. At this level the rod is bent at a right angle and cut off so as to leave a horizontal section about 6 inches long. The metronome is set at an angle with the horizontal section of the rod so that at one end of its beat the pendulum closely approaches but does not strike the rod, while at the other end of its beat the pendulum and rod are widely separated. The spacing is adjusted so that for each intensity of current, sparks pass between the rod and pendulum for only half the duration of each beat; half of each oscillation provides a rest period without delivery of current. The rate of oscillation is regulated by adjustment of the metronome to about 60 per minute. This type of stimulation results in alternate contraction and relaxation of an entire muscle or groups of muscles.

In operating this modality, the static machine is run at higher speed than

in the case of the wave current. In making the connections, the terminal balls are in contact, and when the treatment is started, are slowly separated. A rapid flow of sparks then passes continuously between the balls, and also between the metronome and the rod at the time of their close proximity. The length of the spark between the poles of the machine during treatment varies from ½ to 6 inches; the distance is determined by the sensitiveness of the part treated and the size of the contact plate used. The strength of the discharge should not be so great as to cause pain; it can usually be increased considerably in small steps during the course of treatment, the duration of which is usually 15 to 20 minutes.

This hook-up for the static surge differs from that previously described[1] in that the metronome is substituted for an oscillating wire and ball attached to a Leyden jar. For the suggestion of using the metronome we are indebted to Dr. Victor C. Pedersen of New York. This device permits perfect regulation of a number of variables: the intensity of the current, the degree of surge, the frequency and relative duration of muscular contraction and relaxation.

Alternation of strong muscular contraction and relaxation is also produced by the sinusoidal current, but we have found that the many variables can be regulated more satisfactorily in the case of the static surge. Furthermore, the stimulus to contraction can be made as strong as, if not stronger than that obtainable from the sinusoidal machine. This type of muscle response is not obtainable from any other static modality.

In addition to the well-known effects of the wave current, the static surge produces massive contraction of the muscles beneath the contact plate so intense that tetanic spasm would result were it not for the period of relaxation afforded by the "break" in the discharge obtained by the metronome.

The greatest sphere of usefulness of the static surge is in the treatment of muscle spasm and fibrositis, with or without referred somatic pain.[2, 3] It is contraindicated in true neuritis. Thus it is important to differentiate between organic and reflex types of pain radiation. This discharge is also contraindicated in acute infectious processes.

The static surge produces vigorous exercise of muscles, even of those deeply located beneath the body surface. The effect of alternate muscular contraction and relaxation obtained in this way is probably analogous to that of voluntary, rhythmic muscle work which has been shown experimentally by Barcroft and Millen[4] to increase blood flow through muscles, in contrast to the effect of sustained muscle contraction which decreases blood flow. These authors have also called attention to evidence which suggests that this increase in blood flow is not due solely to mechanical factors, but is, in part at least, caused by the liberation of a vasodilator substance in contracting muscles.[5]

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ION TRANSFER (IONTOPHORESIS) *

COUNCIL ON PHARMACY AND CHEMISTRY

THEODORE G. KLUMPP, M.D., Secretary

and

COUNCIL ON PHYSICAL THERAPY

HOWARD A. CARTER, Secretary

CHICAGO

Questions relating to the method for administering acetyl-beta-methylcholine (Mecholyl, Merck & Company, Inc.) which arose during the Council on Pharmacy and Chemistry's consideration of the drug were referred to the Council on Physical Therapy. That Council voted to give consideration to Apparatus for the administration of drugs by ion transfer and prepared a statement, which is reproduced as the first part of the following report. The Council on Pharmacy and Chemistry voted to recognize the use of acetyl-beta methylcholine chloride by the method of ion transfer provided the firm placed on its labels and in its advertising caution statements as stipulated. This recognition does not carry with it any implication of acceptance for the use of any other drugs by this method without individual consideration and acceptance by the Council on Pharmacy and Chemistry.

The following report has been authorized for publication after consideration by both Councils.

Direct or galvanic current, in addition to being used for muscle or nerve stimulation, may be used to deposit on or in the tissues ions of certain salts and charged colloid particles from solution. "Ion transfer"** is defined as the introduction of soluble salts into the tissues by means of direct current. The term "electrophoresis" applies to a similar movement of colloid particles which are electrically charged or which have absorbed charged particles. The salts of heavy metals such as copper, zinc or tin are frequently used, the positively charged ions moving through the tissues toward the cathode when the current is appropriately passed. Locally these ions may produce precipitation of protein, causing chemical destruction of the tissues. This form of treatment has been used in lesions of the mucous membrane in the practice of proctology, otorhinology and gynecology. The introduction of certain drugs into the tissues by the method of ion transfer (iontophoresis) may also be used to produce systemic effects.

The galvanic current is uninterrupted and unidirectional, and for therapeutic purposes the usual sources are the galvanic wall plate, the motor generator, the valve tube rectifier or the dry cell battery. The efficacy of ion transfer depends on greater penetration of medicaments into the tissue than is obtained by topical application. The depth and local concentration of the medicaments depend on at least two factors. First, although the solution of the medicament is an excellent medium for conducting the current into the tissues, the ions, once introduced, may either become reduced or oxidized to an inactive form or immediately precipitated as proteinates. Second, because of high velocity the ions may be readily eliminated by the body because they are continually swept into the

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** Although "ion transfer" is the preferred term, introduction of drugs by this method for the production of local or systemic effects is sometimes called "iontophoresis," "common ion transfer," "ionization," "medical ionization," "ionic medication" or "therapeutic ionization." It is electrochemically incorrect and clinically misleading to term this method "surgical ionization" when a caustic effect is produced.

systemic circulation by rapidly moving blood, so that their concentration is too low to be effective. These factors explain why the penetration of medicaments is limited to a few millimeters at most.

The following technic is suitable for introducing drugs by ion transfer: The active electrode should consist of material such as asbestos cloth, cotton gauze, stockinet or other suitable fabric resistant to tears, saturated with a solution of the desired medicament. The saturated fabric is wrapped closely around the part to be treated, and a strip or sheet of metal foil cut to the appropriate size and shape is wound over the fabric. The positive pole of the current source is connected to one end of the metal strip which is used to conduct the current evenly over the entire area treated. The negative pole is connected to a dispersive electrode applied to the patient's back, which completes the circuit. The dispersive electrode consists of a large, flat, moistened pad measuring about 10 by 12 inches. The direct current should be turned on and increased gradually until the desired milliamperage is reached, so that unpleasant effects caused by sudden increases are avoided. The rate and amount of the ion transfer may be regulated by the strength of the current and the duration of its flow respectively.

Individual tolerance to the treatment should serve as a guide in determining the strength of the current to be used. The initial treatment should not exceed 5 or 10 milliamperes for thirty minutes. At the conclusion of a treatment the current is reduced gradually to zero reading and turned off. The patient should remain quiet and warm for thirty to sixty minutes following a treatment; after this period he may resume his usual activities. Each treatment should be restricted to a limited area, such as one hand or one joint when several parts are involved. Three or four days appears to be the most satisfactory interval between treatments.

In the treatment of varicose ulcers, the foot and leg as high as the knee are wrapped appropriately in fabric saturated with medicament and the technic described is then followed. Under no circumstances should the moistened fabric or the metal plate be applied directly over the unhealed ulcerated region. Treatment is usually given two or three times a week but in some cases may be repeated daily.

Precautions

The following precautions in the application of ion transfer should be observed:

1. If the sensation of the patient's skin is not normal on test, the current strength must be proportionately selected and carefully controlled according to the size of the electrodes and the milliampere reading.
2. Electrodes must not be applied over denuded areas and must be very carefully applied over recent scar tissue.
3. Electrodes must be sufficiently large to avoid excessive current density.
4. The metal plate of the electrode must be evenly covered by the padding, leaving no bare edges in contact with the skin.
5. The pad covering the electrode must be evenly saturated with the appropriate solution.
6. The electrodes must be applied in good contact by means of even pressure. Tight bandaging, folds, creases and insufficiently moistened areas in the pads may cause nonuniform distribution of current, subjectively manifested first by a local burning sensation.
7. The conducting wires must be fastened securely to the electrodes, so that the metal of the wire tip does not come in contact with the skin.
8. The curernt must be increased slowly at the start; while the milliammeter registers flow of current, the switch must never be opened or closed sharply.

9. The patient must be instructed to report at once any excessive burning or pain. The judgment of patients as to sensation of burning or pain varies with the individual and, regardless of the milliammeter reading, no more current than the patient states is comfortable should be applied. A safe milliammeter reading must never be exceeded even if the patient states that he can stand more current. During a treatment, the milliammeter reading usually increases as skin resistance decreases; a decrease usually indicates that the pads have become partially dry. In remoistening of the pads the current must be turned off, after which the electrodes are removed, and the pads are moistened evenly and carefully reapplied.

10. The strength of the current must be decreased if at any time the patient complains of annoying sensations. If this reduced current does not provide relief, the current must be turned off, the electrodes removed and the cause of irritation determined.

Acetyl-Beta-Methylcholine (Mecholyl)

A 0.2 to 0.5 per cent solution of acetyl-beta-methylcholine chloride (mecholyl chloride) may be introduced by ion transfer. (The Councils point out that a 1:1,000 (0.1 per cent) solution of histamine acid phosphate introduced by ion transfer will produce a nearly identical effect.) The disadvantages in administering mecholyl chloride by ion transfer are (1) difficulty in controlling the dosage, (2) costliness of the drug and (3) administration expense — it requires thirty minutes of an attendant's time.

From a review of the evidence now available, the Council on Pharmacy and Chemistry reached the following conclusions:

1. Local effects of mecholyl chloride on the extremities are best obtained when the drug is administered by the method of ion transfer.

2. General effects of mecholyl chloride may be observed during ion transfer, but these are less pronounced when the drug is given by this method than when the subcutaneous route is employed; general effects of a serious or dangerous nature have not been observed when the drug has been given by this method.

3. Mecholyl chloride may be used by this method without obvious harm and with considerable benefit in some cases of chronic ulcers, Raynaud's disease, scleroderma and certain vasospastic conditions of the extremities.

4. The drug used by this method appears to have a palliative effect on the discomfort in some cases of chronic rheumatoid arthritis.

The Council on Pharmacy and Chemistry decided that ion transfer as a method of administering drugs be recognized by the Council with the understanding that the application of the method must at present be reserved to those especially trained and further that the recognition of the method as such carries with it no implication of acceptance of its use for any particular drug.

ARCHIVES of PHYSICAL THERAPY
OFFICIAL PUBLICATION AMERICAN CONGRESS OF PHYSICAL THERAPY

.·. EDITORIALS .·.

RESEARCH IN PHYSICAL MEDICINE AND THE WAR

"Inter armas silent musae" — during strife the arts keep silent — is an old latin proverb. The present world upheaval has curbed much of medical research by placing a large number of active younger men under arms and by expelling many highly trained medical minds because of racial or political persecution. The medical journals from abroad show this all too plainly. Our own contemporary the *British Journal of Physical Medicine* has shrunk to a shadow of its former self and at that contains on the average at least one leading article borrowed from the American literature. In stimulating contrast, the ARCHIVES OF PHYSICAL THERAPY has been growing steadily in size and standard of contents and is facing the future with stout confidence. For there are many redeeming features in our field of special interest.

It has often been said that one good thing in medicine resulting from the first World War was the impetus it brought to physical therapy. Modern physical methods of treatment as practiced now throughout the United States had their inception in the reconstruction hospitals of the first World War. Naturally, much of that early work was done under the influence of the basic work abroad. Controlled clinical and research work in physical therapy had hardly begun in the United States at that time. In the intervening twenty odd years this situation has entirely changed. In the United States physical therapy has forged ahead so much, that the rest of the medical world looks now "over here" for information and inspiration.

Artificial fever treatment is perhaps the foremost among the newer physical therapy methods in the progress of which in recent years Americans have taken a leading role. This work culminated in the holding of the First International Conference in Fever Therapy in New York four years ago. Extensive follow-up studies of short wave diathermy were done in the United States and the scope and limitations of the new method are being determined here. The ingenuity of American physicists developed a wide range of efficient short wave apparatus which is exported to all parts of the world. Some of the methods of electrosurgery, especially electrodesiccation and the wide use of the cutting current had their inception in the United States. The method and scope of underwater exercise has been brought to world wide attention by the work of American orthopedists and physical therapeutists. A variety of methods of treating peripheral vascular disease was created by American physiologists and clinicians. Another recent promising development by the combined efforts of American physicists and medical men is air sterilization by ultraviolet irradiation. So far as organized medicine is concerned, it had only in this country the power and foresight to create a body such as the Council on Physical Therapy of the American Medical Association. Our English and French colleagues often expressed their respect for this body, which encourages the more widespread employment of physical measures by the medical profession, stimulates basic research and at the same time effectively curbs over enthusiasm and commercialism.

The factors enumerated have tended to elevate gradually, but irresistably the quality and extent of physical therapy work done in the United States.

With the large scale training of medical men and technical personnel in physical therapy methods now instituted in the United States in connection with the national emergency, it is to be expected that there will be a further impetus for the employment of physical therapy measures on a more widespread scale, for more research and for the development of more efficient methods.

THE 20TH ANNUAL CONVENTION IN WASHINGTON

The twentieth annual scientific and clinical session of the American Congress of Physical Therapy will be held at the Mayflower in Washington, D. C., September 1-5.

The program committee has made some changes in the program this year. All special sections have been eliminated and it is therefore necessary to utilize all time possible. The afternoon sessions will begin at 1:30 and three papers will be given within an hour at which time there will be an intermission until 3:00 o'clock. These first three papers will not have any discussion. The last four papers will have assigned discussors and also open for discussion on the floor. Two excellent evening programs have been prepared and should attract wide attention.

The program committee has attempted to cover various subjects in physical therapy, but as you can well understand, it is impossible to cover every phase. Perhaps there is some subject you would like to have presented on the program next year. The committee would like to have suggestions from its members and it is therefore setting up a special booth where you might make your requests in writing. Please be sure and stop at this booth while at the convention.

The committee on the instruction course has made a special effort to cover the field of physical therapy and set up the courses in various grades from elementary to advanced discussion.

The instruction courses will begin at 8:30 a. m. and continue until 10:30 a. m. at which time there will be a half hour intermission. The final lecture will be given from 11:00 to 12:00 o'clock.

The intermission periods in the program have been arranged so that you might have more time in which to study the scientific exhibits and also inspect the technical exhibit.

An excellent group of scientific exhibits has been secured and it will be worthwhile to visit each one of these exhibits. Those who have attended Congress sessions of the past few years will well remember the splendid exhibits of decided instructional and educational value.

A large and representative group of technical exhibits should prove worthwhile to everyone attending the convention.

The one social event of the meeting is the Congress dinner which will be held on Wednesday evening, September 3. On this occasion the gold key awards and medal winners of the scientific exhibits will be announced. The committee has promised several entertaining features with a minimum of speeches. Ladies and other guests are welcome.

One other feature in which increasing interest is shown each year is the visit to various physical therapy departments in the convention city. Five departments will be open for inspection on Saturday morning, September 6. Full particulars of the tour will be available at the registration desk.

THE INSTRUCTION COURSE

In organizing the schedule for the Instruction Course, which has become an important phase of the annual meeting of the Congress of Physical Therapy, the Committee gave careful consideration to the experiences of previous years. It was determined that there was a need for both elementary and advanced courses. It was also agreed that it would be wise to offer a course dealing with the advanced fundamental aspects of physical therapy and another dealing with the advanced clinical aspects of the subject. Furthermore, it was felt that the courses should be well organized and should progress in an orderly fashion.

The Committee is well pleased with the final arrangements for the courses, and desires to call especial attention to the way in which the lectures have been arranged. The lectures from E-1 to E-12, inclusive, deal with the elementary aspects of physical therapy and will be of especial interest to the general practitioner who desires, for the first time, to get more knowledge of physical therapy. This course will also be of interest to technicians. Lectures AF-1 to AF-12, inclusive, are designed especially for the physician who already has some knowledge of physical therapy and wishes particularly a review of the more important advanced fundamental aspects of the subject. Lectures AC-1 to AC-12 deal with the advanced clinical aspects of the subject and will be of particular interest to general practitioners who have taken previous courses and to specialists in the field who desire more knowledge of physical therapy in relation to certain diseases, such as arthritis, cerebral palsy and injuries to the peripheral nerves. Finally, lectures AG-1 to AG-12 comprise an advanced general course dealing with certain phases of physical therapy which past experience has shown us are of particular interest to physicians and technicians.

The Committee is especially pleased with the excellent faculty which has been obtained to present this organized course of instruction. A group of trained physicists, headed by such men as Howard Carter, secretary of the Council on Physical Therapy of the American Medical Association, Myron Schwarzschild, physicist at the Beth Israel Hospital, New York, and William T. Anderson, expert on the physics of light, will present lectures dealing with the fundamental aspects of physical therapy. Electrotherapy will be covered by such outstanding experts as William Bierman, Disraeli Kobak and Richard Kovács. The subject of fever therapy will be discussed by two of the leading exponents in this field, William Bierman and Worley Kendell. Walter McClellan of Saratoga Springs, recognized as the outstanding authority on hydrotherapy, will discuss this subject for our group. Occupational therapy will be adequately covered by outstanding representatives of the American Occupational Therapy Association, with whom we are honored to hold a joint meeting this year. Among those who will address members of the instruction course group will be Miss Henrietta McNary of the Milwaukee-Downer School of Occupational Therapy and Miss Helen Willard, director of the Philadelphia School of Occupational Therapy. The Army will be represented by Captain Benjamin Strickland, director of the Physical Therapy Department of the Walter Reed General Hospital, and by Lieutenant Christopher J. McLoughlin, director of Physical Therapy at the Lawson General Hospital.

It is impossible to list all of the outstanding instructors who will be present at this meeting; and it seems almost unfair to mention some instructors without mentioning all of the experts who will be available. However, the Committee will plead for the indulgence of those who are not mentioned, and point out that one can pick at random from the faculty and mention prominent experts whom everyone will wish to hear: Phillips on the fundamentals of physical therapy in general practice, Titus on physical therapy in surgery, Coulter on physical therapy in amputations, Solomon on physical therapy in arthritis, Bennett on physical therapy in poliomyelitis, Cipollaro on physical therapy in dermatology, Hollender

on physical therapy in otorhinolaryngology, Polmer on the physiologic effects of heat, Watkins on the operation of a physical therapy department, William Schmidt on physical therapy in neurology, Milton Schmitt on high frequency currents, Ewerhardt and Hansson on corrective exercise, McGuinness on physical therapy in obstetrics and gynecology, Moor on research technic in physical therapy, Martucci on colonic therapy, Knapp on physical therapy in fractures and Molander on the administration of a physical therapy department.

Each of these instructors is an authority in his field. Every member of the Congress and every physician who is interested in physical therapy will want to hear this outstanding group of lecturers. It is hoped that this Instruction Course will attain a new high in postgraduate training in our rapidly developing field of medicine.

MEDICAL NEWS

COURSES FOR PHYSICAL THERAPY TECHNICIANS (PHYSIOTHERAPY AIDES) FOR GOVERNMENT HOSPITALS

The Mayo Clinic

An emergency course for physical therapy technicians was started at the Section on Physical Therapy of the Mayo Clinic, Rochester, Minnesota, July 1, 1941. This Section of the Mayo Clinic is under the direction of Dr. Frank H. Krusen and Dr. Earl C. Elkins.

The course will last for 26 weeks, 50 hours per week, making a total of 1,300 hours. Of these, 1,200 hours will be devoted to the course and 100 hours will be available for vacations and study periods. There is no tuition fee. There are forty students enrolled.

Dr. Frank H. Krusen is the author of a new book, "Physical Medicine," which is being used as a textbook in many of the schools for physical therapy technicians. Dr. Elkins is on the Editorial Board of the ARCHIVES OF PHYSICAL THERAPY.

Northwestern University Medical School

An emergency course in physical therapy opened at Northwestern University Medical School July 1, 1941. Dr. John S. Coulter is the medical director of the course, and Miss Gertrude Beard is the technical director.

The course consists of a total of 1014 hours, 284 being devoted to theory and 730 to laboratory and practice training.

The tuition fee of $200 is payable in three equal installments. There are 17 students enrolled. A similar course will be given January 2, 1942.

Walter Reed General Hospital

The emergency training course for physical therapy technicians was started July 1 at Walter Reed General Hospital, Washington, D. C., and is available only to graduates of four year courses in physical education. Another course will be started in January, 1942. The director of the course is Captain B. A. Strickland, Jr., Medical Corps, U. S. Army.

The curriculum includes 343 hours of theory, 218 hours of class practice and 450 hours of practice in the actual treatment of patients, totaling 1,011 hours. There is no tuition fee.

Stanford University

The Stanford University in its School of Health (Women) is offering an emergency course of six months for physical therapy technicians. This course is under the direction of Miss Catherine Worthingham, Director of Physical Therapy of the School of Health, Stanford University, and William H. Northway, M.D., Director of Physical Therapy, Stanford University Hospital, San Francisco, California.

The course started June 23, 1941, with seven students enrolled. Another course will be given January 3, 1942. The curriculum is given in 28 consecutive weeks, 760 hours of laboratory and theory and 262 hours of clinical practice.

The tuition fee is $130 for each of two quarters.

Dr. Madge C. L. McGuinness Presents Activities of the Special Committee on Physical Therapy

Dr. Madge C. L. McGuinness, Chairman of the Special Committee on Physical Therapy of the Medical Society of the County of New York, recently read a report of the activities of this Special Committee. It was pointed out that much education is needed to forward the legitimate claims of physical therapy as a useful adjunct in properly trained hands to medicine and surgery.

Dr. McGuinness further stated, "It is odd that a physician who is most meticulous in choosing a surgeon, obstetrician, ophthalmologist or other specialist, does not exercise the same care in the matter of physical therapy."

The need was discussed for many more skilled workers in physical therapy, not alone as now, in industry, but for the new military forces that are growing daily.

In an editorial comment on this report (*New York Med. Week*, July 19) it was pointed out that lay technicians are making ever-increasing inroads on specialties like radiology, physical therapy and clinical pathology. It was felt that those interested in physical therapy do not do enough about this. "It should be the broader duty of the physician not to permit his patients' ignorance or obstinacy to land them in the hands of quacks. Confronted with such a situation the physician should take the time and trouble to explain why physical therapy must be considered a branch of medicine and kept under the control of specially trained men. This means intensive war on lay ignorance and medical inertia — one war in which every practitioner should feel it his duty to enlist."

Dr. Torbett Presents Organ to Methodist Home

Dr. J. W. Torbett, of Marlin, Texas, well-loved member of our Congress, has presented an organ known as the Torbett Memorial Organ to the Methodist Home at Waco, Texas, in memory of his father. Dedication ceremonies took place in the Harrell Chapel of the Home on May 18.

Dr. Torbett, who is president of the Torbett Clinic and Hospital at Marlin, is president of the Board of Directors of the Methodist Home of Waco.

Dr. Northway to Address Postgraduate Group

Stanford University School of Medicine, San Francisco, announces a series of postgraduate medical courses for practicing physicians to be given in cooperation with the city department of health and the San Francisco Hospital, September 8-12. Courses will be offered mornings, afternoons, and all physicians are urged to attend the evening meeting which have been arranged. Dr. William H. Northway will address one of the evening meetings, on "Use of Physical Therapy in Modern Medicine."

New Course for Physical Therapy Technicians

The College of Medical Evangelists announces the opening of its School of Physical Therapy, July 1, 1941. The School of Physical Therapy is conducted in Loma Linda and Los Angeles, California, and is under the direction of Dr. Fred B. Moor and Dr. Clarence W. Dail. The first six months of the course are taught at Loma Linda in order to utilize the teaching facilities in anatomy, physiology, pathology, bacteriology, and the fundamentals of physical therapy which this divison of the medical school provides. The second six months of the course are taught in Los Angeles where there are ample clinical opportunities for work with patients at the Physical Therapy Department connected with the White Memorial Hospital and Clinic.

The curriculum consists of 1,524 hours, 516 of which are didactic and 1,008 of which are laboratory. There is a tuition fee of $200.

American Occupational Therapy Association 25th Annual Meeting

The American Occupational Therapy Association will hold its Twenty-fifth Annual Meeting in Washington, D. C., September 1-5, 1941, in conjunction with the American Congress of Physical Therapy, with headquarters at the Mayflower Hotel. Their membership totals approximately fourteen hundred persons from all parts of the United States and foreign countries.

With defense uppermost in our minds today, it is especially propitious that the annual convention should be held in Washington, D. C., the Headquarters of Defense. Occupational therapy, which so effectively arose to meet the exigencies of the last War, is again readying itself for its share in today's national emergency. The World War training courses of a few months have grown into three years, the standards of training have been set by the American Medical Association, and the American Occupational Therapy Association now coordinates activities throughout the country and maintains a registry for qualified occupational therapists on which 1,999 are enrolled. Occupational therapy, not only has a proven place in the rehabilitation of the mentally ill, but in the reconstruction of orthopedic and surgical casualties. It is this dual approach to the problem of rehabilitation that makes occupational therapy's offering unique! "War is no longer fought by armed forces on chosen battlefields, but involves every man, woman and child residing within the boundaries of nations at war." Occupational therapy, with its carefully planned and definitely guided occupations, may be used as a means of conserving and bringing into play whatever remains to the sick and injured for healthy functioning and reestablishing capacity for industrial and social usefulness, thus giving moral and material assistance to the defenders of democracy.

The local convention committee has selected a program, which will be unusually interesting from educational, scientific and social standpoints. Justly renowned specialists, including famous psychiatrists, physicians, physical therapeutists, occupational therapists, nurses, and authorities on cardiacs, the tuberculous, veterans and defense, will participate in the general sessions and round table conferences. There will be a section devoted to educational and scientific exhibits, displaying unusual types of therapeutic activities and case histories, with photographs; also there will be demonstrations of occupational therapy technics. Social highlights of the program include a tea or reception at the White House and the banquet at the Mayflower Hotel.

Whatever the visitor's particular interest may be, a trip to some of the outstanding hospitals in ad-

jacent areas will be gratifying. Sight-seeing trips have been arranged for those desiring to take advantage of the opportunity to become better acquainted with the famed beauties of the Nation's Capital, historic Maryland, scenic and colonial Virginia.

Information concerning the convention program may be obtained by writing to the Chairman of the Committee on Program, Mrs. Arvilla D. Merrill, O.T.R., St. Elizabeth's Hospital, Washington, D. C.

POSTGRADUATE EDUCATION IN PHYSICAL THERAPY

New Jersey

Speaking at the spring session of the Eastern Section of the American Congress of Physical Therapy on April 5, Dr. Jerome H. Samuel, of Newark, N. J., reported the success of the program for the postgraduate instruction in physical therapy carried out by the Essex County Medical Society from Oct. 25, 1940 to Feb. 20, 1941.

This program was arranged by the Physical Therapy Committee of the Essex County Medical Society, Dr. Stuart Z. Hawkes, chairman. Other members of the committee were Dr. Robert Y. Hubbard, Dr. Charles R. Brooke and Dr. Samuels.

Nine lectures were given by members of the county medical society who are specialists outside the field of physical therapy but use this specialty in their practice. Membership in the course was to have been limited to twenty members of the county society, but applications came from other counties and were accepted. The total registration was twenty-seven. Each lecture lasted an hour and a half, with the last fifteen minutes given over to questions and answers.

The following subjects made up the series of lectures:

Physical Therapy in Certain Neurologic Conditions, *Lewis H. Loeser,* M.D., Newark City Hospital, Newark; Physical Therapy in Peripheral Vascular Disorders, *Harold Hantman,* M.D., Presbyterian Hospital, Newark; Physical Therapy in Certain Gynecologic Conditions, *Edwin Steiner,* M.D.; Demonstrations by *William Brams,* M.D., Newark Beth Israel Hospital, Newark; Physical Therapy in Certain Dermatologic Conditions, *Francis McCauley,* M.D., Newark City Hospital, Newark; Desiccation, Coagulation, Fulguration, and the Cutting Current in Office Practice, *Milton Friedman,* M.D., Newark City Hospital, Newark; Physical Therapy in After-Care of Fractures and Other Traumatic Lesions, *John Flanagan,* M.D., St. Michael's Hospital, Newark; Physical Therapy in Certain Nose and Throat Conditions, *E. P. Cardwell,* M.D., and *C. R. Brooke,* M.D., St. Barnabas Hospital, Newark; Physical Therapy in Arthritis, Bursitis, Neuritis and Allied Conditions, *B. S. Troedsson,* M.D., Orange Memorial Hospital, Orange; Physical Therapy Methods in Rehabilitation (With Sound Movies and Lantern Slides) *Henry H. Kessler,* M.D., Newark City Hospital, Newark.

An effort was made to have each lecturer use a different hospital, the choice being left to his discretion. The discussion of theory was kept to a minimum, and practical application was emphasized. The mention of concomitant medical-surgical therapy was encouraged.

In accordance with the desire to keep the cost of this graduate instruction within the reach of the younger practitioners, $5 was set as the fee for the entire series. The lecturers served without recompense.

Preliminary notices to each hospital in Essex County for posting and to the secretary of each medical staff for reading at monthly staff meetings were mailed. At the beginning of the series a mimeographed final list of the lectures were forwarded to each registrant, and one week before each lecture a mimeographed post card was sent to him, reminding him of his title, place, subject matter and lecturer.

Every lecturer had ample clinical material and fully and unselfishly imparted knowledge that it had taken many years to gain.

Upon the completion of the course, mimeographed letters were mailed to each registrant asking for his comments, requests for future lectures and also advice as to future content matter.

New York

The Council Committee on Public Health and Medical Education of the Medical Society of the State of New York under the chairmanship of Dr. O. W. H. Mitchell is offering a choice of postgraduate courses to all county societies in the state. These courses are given free of charge to all physicians and the expense of the course is borne by the state society. There are two courses offered on physical therapy, and in past years a number of county societies voted for these and received them. The list of all courses is published in a folder which is sent yearly to all county societies.

Course I comprises lectures on:

The Therapeutics of Heat; Medical and Surgical Diathermy; Physical Therapy in General Practice, by *Richard Kovács,* M.D.; The Therapeutics of Massage and Exercise: Physical Therapy in Traumatic Conditions, *Kristian G. Hansson,* M.D.; Medical Electricity. Physical Therapy in Gynecology, by *Richard Kovács,* M.D.; The Therapeutics of Water and Light; Physical Therapy in Medical Conditions, by *William Bierman,* M.D.

Course II, given by *Richard Kovács,* M.D., consists of four lectures:

Electricity in Medicine; Light, Water and Exercise; Physical Therapy in Medical Conditions, and Physical Therapy in Surgical Conditions.

Dr. Kovács in four lectures presents a brief review of the subject of physical therapy from the standpoint of the usefulness of physical therapy to the general physician. This course is to be recommended to county medical societies where instruction in the fundamentals of this specialty is desired.

Dr. A. Saralegui, Director of the Institute for Radiology and Physical Therapy in Buenos Aires Honored at Dinner in Chicago

On July 28, 1941, in Chicago a dinner was held at the University Club to honor Dr. A. Saralegui, Professor of Radiology and Physical Therapy in the faculty of medicine of Buenos Aires and Director of the Municipal Institute for Radiology and Physical Therapy in Buenos Aires. Among those present were: Dr. Hollis Potter, Dr. James T. Case, Dr. Max Cutler, Dr. Benjamin H. Orndoff, Dr. Milton Schmitt, Mr. Brian Doble, Colonel J. E. Bastion, U. S. Army Medical Corps, Sixth Corps Area Surgeon, and Dr. John S. Coulter.

This institute, founded in 1925, (*J. A. M. A.* **117:** 212 [July 19] 1941) is under the control of the public health department of the city. It has divisions of radiology, radium therapy, electrology, diathermy, light therapy, physical therapy and hydrotherapy. A sixty bed ward affords temporary hospitalization. The central portion of the structure has six stories and the wings three, thus making possible abundant light and air. The radiologic division commands eleven roentgenologic and three fluoroscopic chambers, each of which is designed for a special type of diagnosis, and no changes need be made in the position of the roentgen tubes. The roentgenologic division can accommodate one hundred persons within four hours. The division for electrodiagnosis and therapy contains fourteen rooms for the treatment of men and an equal number for the treatment of women and ten each for diathermy. Eight rooms are set aside for ultraviolet and infra-red treatments. The radiologic division possesses 2 Gm. of radium, distributed over three hundred and forty tubes and needles. An apparatus for teleradiotherapy is under construction. Facilities for the filing of the roentgenograms are thoroughly organized.

The forty-five physicians active at the institute meet once a month for a scientific session and publish the *Anales*, which appears every three months. Courses for physicians are given three days of the week. Two scholarships, open primarily to Pan American physicians and lasting nine months, are to established.

American Physiotherapy Association Meeting

The American Physiotherapy Association reports a very interesting conference which was held at Lagunita Court, Stanford University, July 13 to 18. The members of the Association long have felt that a convention ends where it should begin. Many interesting papers are presented, but there is never sufficient time for discussion and questions. This year, each topic selected was developed and discussed for a period of four days in one and one-half hour sessions. A consultant was present in each group for the entire four days. We were particularly fortunate in our consultants: Dr. Frances Baker and Dr. Verne T. Inman, of the University of California; Dr. Charles H. Danforth, of Stanford University; and Dr. Charles L. Lowman, of the Orthopedic Hospital in Los Angeles. The consultants were most generous in their contributions and time, many of them taking part in several discussion groups.

Dr. Herman Chor, of Northwestern University, continued his daily classes in "Psychology of the Invalid and Handicapped," and "Skeletal Muscle," during the conference and was extremely well received. Dr. William H. Northway, Dr. Clifford Sweet, and Dr. R. R. Newall contributed to the presentations and discussions on certain days of the conference.

Much of the presentation this year was done by members of the Association, followed by discussion from the consultants and members of the conference.

An interesting new feature was the reporting of all the sessions by an audiophone system. The presentation and discussion of each topic will consequently be available in mimeographed form and should prove a valuable record of this stimualting conference.

National Foundation for Infantile Paralysis Announces Distribution of New Grants

With several epidemics of infantile paralysis now making their appearance, the announcement by Mr. Basil O'Connor, New York, president of the Foundation of the distribution of new grants totaling $195,030 is of particular significance.

Of interest because of their aid to work in physical therapy and orthopedics are the following:

Two grants totaling $5,600 have been made to the University of Minnesota, one for the investigation of certain aspects of the development of lesions from the disease in the spinal cord and the other to continue aid to the University in conducting a course in orthopedic public health nursing.

A grant of $2,000 has been paid to Tuskegee Institute, to provide a fellowship to a man trained in orthopedic shoe making. The amount of this grant will make it possible for him to go to Warm Springs, Georgia, occasionally for study and wherever else may be necessary in carrying out his particular work aiding those who have been stricken with the disease.

On the West Coast a study involving precise analysis of the movements of the various joints of the body, a project of particular importance in the treatment and after-effects of the disease will be continued by the University of California Medical School, San Francisco, under a grant of $4,250.

A grant of $1,750 to the New York Orthopaedic Dispensary and Hospital, New York, will make possible a continuation of a study of the inequality of growth and development of the lower extremities of persons afflicted with infantile paralysis.

A continuation of work on the development of an objective method of determining the active power of muscle groups concerned with certain motions of the trunk of the body on the pelvis in cases of infantile paralysis and a determination of the necessity for and the effectiveness of operations and conservative

treatment of patients suffering from paralysis of these muscle groups will be possible under a grant of $1,700 to the Hospital for Joint Diseases, New York.

A grant of $1,000 to the Hospital of the New York Society for the Relief of the Ruptured and Crippled, New York, will permit a continuation of a study of paralytic curvature of the spine, including the problem of preliminary care and prevention, the indications for operation and when it should be performed, the mechanics involved in the condition and the care and follow-up after operation.

Under a grant of $9,200, the Strong Memorial Hospital, at the University of Rochester, Rochester, New York, will continue studies to determine the functional indices in normal and abnormal locomotion.

The University Hospital, The State University of Iowa, Iowa City, under a grant of $7,100 will continue an evaluation of treatment in the return of muscle function and the prevention of deformity in acute and subacuate infantile paralysis, with special attention being given to the determination of the optimum period of splinting and the relative merits of treatment measures, as well as to continue a critical and analytic study of gaits in infantile paralysis with emphasis being placed on comparative studies of preoperative and postoperative cases.

A grant of $3,000 to the State University of Iowa will permit a continuation of studies of the extent and velocity of muscle and nerve regeneration in connection with the disease and other aspects of this problem.

Two grants totaling $7,930 to Michael Reese Hospital, Chicago, will permit a continuation of previous studies in various aspects of the treatment of infantile paralysis and some aspects of the after-effects of the disease.

A grant of $400 to the Children's Hospital, Baltimore, Maryland, will permit a continuation of a study of the relation of excision of the abdominal muscles to the development of curvature of the spine.

Discovery of New Powerful Battery.

One of our distinguished colleagues Dr. A. B. Hirsh, even though on vacation at Southwest Harbor, Maine, has in the interest of furthering our information called attention to a promising discovery in the basic electric science. As in many times in the past our readers have been indebted to the restless search for knowledge by our erudite dean, Dr. Hirsch. He submits the following short bit of information that is long in promise if this can be appraised for its future therapeutic possibilities. The New York *Times* of August 6, 1941, asserts that —

"Development of the most powerful primary battery ever made was announced yesterday by Thomas A. Edison, Inc., Bloomfield, N. J. This new electric storage battery, of the 'wet' cell type, has over 70 per cent more current output than any of its predecessors, according to the company. It has a rated capacity of 1,000 ampere hours and will deliver that amount of power at any rate of current up to twenty amperes. The average operating voltage is approximately .65 volts, with higher voltages available by connecting a number of batteries in series."

It is hoped that this powerful battery will soon be studied for its potential value in electrotherapy and reported upon in a future session of our Congress.

Sale of Mineral Waters

The reichs commissioner for price control (*Klin. Wchnschr.* **20**:672 [June 29] 1940) has ordered a new uniform price fixation for more than a hundred German mineral waters. Hereafter, mineral waters will no longer be sold in taverns but only in drug stores and in stores specializing in mineral waters. Drug stores furnish information about names, action and prices of the mineral waters. — ("News from Germany," J. A. M. A. 117: 213 [July 19] 1941.)

Dr. Farel Jouard 1884-1941

The central office of the Congress has just learned of the passing of Dr. Farel Jouard of New York City, April, last. Dr. Jouard was graduated from New York Medical College in 1918, and devoted his practice especially to diseases of the ear, nose and throat. He has been a member of the Congress for many years, and was also a member and active leader in the New York Physical Therapy Society, in which organization he held numerous executive offices. He was ever ready to help out when needed, and his passing will be deeply felt by his many colleagues and friends. The staff of the ARCHIVES and the members of the Congress express their condolence to the family.

BOOK REVIEWS

ACCIDENTAL INJURIES. The Medico-Legal Aspects of Workmen's Compensation and Public Liability. By *Henry H. Kessler*, M.D., Ph.D., F.A.C.S., Medical Director, New Jersey Rehabilitation Clinic; Formerly Medical Adviser, New Jersey Workman's Compensation Bureau; Attending Orthopedic Surgeon, Newark City Hospital, Newark Beth Israel Hospital, etc. Second edition. Cloth. Pp. 803 with 202 engravings. Price, $10.00. Philadelphia: Lea & Febiger, 1941.

This is the second edition of this deservedly popular book on the medico-legal aspects of accidental injuries in relation to workmen's compensation and public liability. This edition has been considerably enlarged and thoroughly revised with special emphasis on traumatic neuroses and rehabilitation. The material is based on the author's experience which covers more than 100,000 cases examined at the New Jersey Rehabilitation Clinic and the New Jersey Workmen's Compensation Bureau during the last twenty years. The statistical material embodies more than a million individual reports. Dr. Fred H. Albee, Chairman of the New Jersey State Rehabilitation Commission, states in his foreword: "Fitting physically handicapped persons into our social and economic structure has become one of the most vital problems of our speed-machine age, a problem of such magnitude and so many ramifications that it affects every citizen in the Union." This book is concerned with the physician's responsibility in this problem. The author presents chapters on history; medical aspects of workmen's compensation laws; schedules for rating disabilities; pathology of trauma; the end results of trauma; general principles underlying disability; chapters on injuries to various parts of the body; injury and disease; accident neurosis; occupational disease and the rehabilitation of the physically handicapped. It should be in the library of every physician treating accidental injuries.

AN INTRODUCTION TO MEDICAL SCIENCE. By *William Boyd*, M.D., M.R.C.P. (Lond.) Dipl. Psch. F.R.S. (Canada). Professor of Pathology and Bacteriology in the University of Toronto, Toronto; formerly Professor of Pathology in the University of Manitoba; Pathologist to the Winnipeg General Hospital, Winnipeg, Canada. Ed. 2. Cloth. Pp. 358 with 124 engravings. Price, $3.50. Philadelphia: Lea & Febiger, 1941.

The study of disease and of the many vast subdivisions of medical science pertaining to anatomy, physiology, bacteriology, medicine and surgery is becoming more and more involved. It is refreshing even for graduate physicians to be lifted above the most of these complex subjects and get an airplane view of disease as a whole, its causes and the bodily changes which accompany it. This is even more important for medical technical personnel, because it should help them to gain a clearer concept of the ultimate aim of their studies, namely, the intelligent caring of the sick under competent direction. The author of this volume, a pathologist of note, has set out with the object outlined and has fulfilled it admirably, with an absorbing, readable and well-rounded presentation. The volume is divided in three sections, the first dealing with the general principles of disease, the second with the diseased organs and the third with some practical applications. The chapter titles in the first section are: the Living Body, the Evolution of Medical Science, the Nature and Causes of Disease, Disturbance of the Blood Flow, Inflammation, Immunity and Allergy, Bacteria and Bacterial Infections. Some Animal Parasites and Tumors. The fourteen chapters of the second section deal successively with the diseases of all organs and body systems. The last section contains chapters on the prevention of disease and on the nurse and the laboratory. The book is well illustrated by many schematic drawings and photographs of patients and pathologic specimens. Its general make-up and typography are of the usual excellent standard of the publishers. While this volume is primarily intended as an aid in the training course of nurses, it can be highly recommended to all physical therapy, laboratory and x-ray technicians. Its perusal will help them to find their daily tasks more interesting, and they will have on hand a small but convenient reference work on questions relative to disease and its treatment.

THE MARCH OF MEDICINE. By New York Academy of Medicine. Lectures to the Laity, 1940. Cloth. Price, $2.00. Pp. 154 with no illustrations. New York: Columbia University Press, 1941.

This book contains six essays written by authorities in the field of medicine on subjects little known to the layman. A foreword and an introduction explain briefly and concisely the purpose of the essays. The essay on the inheritance of mental disease should be read with interest by any intelligent layman. The definitions of the various types of mental diseases are clear; many erroneous concepts are refuted. An interesting discussion of chemical warfare against disease includes a brief history of the discovery of most of the important drugs used today. Many diseases of the blood are defined briefly and discussed in an essay entitled "The story of our knowledge of the blood." "The stories of viruses" is an interesting chapter concerning the discovery of viruses and diseases that they cause. "The ascent from bedlam" is an extremely interesting discussion of the development that has occurred in the diagnosis and treatment of mental diseases in the last hundred years. Finally, there is the chapter, "The romance of bronchoscopy," written by one of the greatest authorities on the subject. The publication

of such discussions is timely. The essays in this volume have been sponsored by the New York Academy of Medicine and have been delivered to lay audiences. The text is readable, entertaining and educational; the book can be highly recommended for the laity.

TEXTBOOK OF PEDIATRICS. By *J. P. Crozier Griffith*, M.D., Ph.D. Emeritus Professor of Pediatrics in the University of Pennsylvania, Consulting Physician to the Children's Hospital, Philadelphia; etc., etc., and *A. Graeme Mitchell*, M.D., B.K. Rachford Professor of Pediatrics, College of Medicine, University of Cincinnati; Medical Director and Chief of Staff of the Children's Hospital, Cincinnati, etc., etc. Third Edition. Revised and Reset. Cloth. Pp. 991 with 220 illustrations. Price, $10.00. Philadelphia and London: W. B. Saunders Company, 1941.

It may be approaching the border of triteness to assert that children are people and that in this country alone millions of budding humans attain adolescence under handicaps that challenge the intelligence and greatest resourcefulness of medical science. Because the care and development and treatment of the child is surrounded with greater drama and poignant suffering the literature of this specialty has more closely kept abreast with medical progress and has been responsible for greater progress in this field than has any other branch of medicine. This third edition reflects in tone and trend the best of American medical tradition in the management of the child under all the pathologic conditions through which it is surrounded. In order to keep the great mass of medical knowledge to proportions both practical and authoritative, Griffith and Mitchell have called into collaboration 64 nationally recognized associates whose competency within and outside the pediatric field is well established, besides others of equal caliber who have reviewed the mass of material as critics, editors and advisors.

Perhaps the most radical feature of this edition is the omission of the massive bibliography, which because of size and cumbersomeness, has been separately published in monograph form by the Society for Research in Child Development, National Research Council, Washington, D. C. No matter what the reason was that dictated this departure from routine style, many students and physicians will no doubt be handicapped in their desire to pursue the discussions to the limits of the suggested literature. From a practical clinical viewpoint few will carp at the detail provided and most will find the pages rich in inexhaustable data. In the space of 12 sections and 98 chapters the volume presents the latest opinions and most scholarly review of the broad subject of pediatric practice. Space will only permit a somewhat general impression of the intention of this contribution because it is clearly impossible to review in any detailed fashion its broad scope. Of the chapters that are new to this edition it may be interesting to point out the one on "Mental Growth and Development" written in collaboration with Dr. James S. Plant, to call attention to the presence of many new illustrations and the complete revision of certain portions which for practical purposes and compactness have molded this work into that pleasing format of a "streamlined" edition.

FLUORESCENT LIGHT AND ITS APPLICATION. Including Location and Properties of Fluorescent Materials. A Theoretical and Practical Exposition of Fluorescence and Similar Phenomena. By *H. C. Dake*, Editor, "The Minerologist Magazine;" Co-Author, "Quartz Family Minerals;" Honorary President, Northwest Federation of Mineral Societies; and *Jack De Ment*, Associate Editor, "The Mineralogist Magazine;" Research Chemist, The Mineralogist Laboratories. Cloth. Pp. 256 with illustrations. Price, $3.00. Brooklyn, N. Y.: Chemical Publishing Co., Inc., 1941.

This informative book opens up far reaching vistas for us to contemplate along the "whence and whither" lines with reference to the future applications of fluorescent phenomena for diagnostic purpose. It presents in informal style the fascinating story of the mysteries of photoluminescence, its investigation and interpretation for over a century, and evaluates those contributions which within recent years have been advanced by many students in different countries on the diversified problems related to this subject. Accordingly the exposition is a rich collection of facts related to the mysterious emission of light and color inherent in certain minerals, vegetables and animal substance, designated as phosphorescence and fluorescence, which are associated with the more inclusive physical properties classified as radiation. It may be a long cry from the Egyptians who employed secret luminous preparations to mystify a gullible public, or the alchemists' use of like substances to awe the credulous to that by the modern engineers and their use of similar material on our highways as a guide to traffic through dark and dangerous byways, or detection of moneys, pigments, chemicals and biologic products. It brings home the important fact that fluorescent light and its application in home, laboratory, museum and counting house is of such growing proportion that any well prepared discussion on such a subject is bound to be read by an interested and highly diversified audience. In the space of eleven chapters the authors have reviewed the historical aspects of luminescence; discussed the physical nature of so-called cold radiation and its color differences; its theory, influence and activation; technical methods of examination and supply sources; its action on minerals, semiprecious gems and antiques, ceramics and art objects; and its diagnostic value in medicine, biology and chemistry. Thus this work opens up a terrain of practical information to those interested in such separated problems as medicine and allied fields, or those of interest to criminologists and jewelers, prospectors of minerals, examiners of antiques, glassware, detectors of forgery, and the like. The work closes with 20 pages of closely printed bibliographic material and an index of authors and subjects. Perhaps the single objection that may be raised by the medical profession is the inadvertent omission of the rich information published in recent years by Plotnikow and other workers, which could with great profit have been incorporated in this pub-

lication at greater detail. This suggestion is passed on to the authors in the hope that their next edition will be enhanced by such a digest on photo-diagnostics, because its coming importance in medicine is attested by an ever increasing literature on this most practical of subjects.

THE AMERICAN ILLUSTRATED MEDICAL DICTIONARY: A Complete Dictionary of the Terms Used in Medicine, Surgery, Dentistry, Pharmacy, Chemistry, Nursing, Veterinary Science, Biology, Medical Biography, etc., with the Pronunciation, Derivation, and Definition. By *W. A. Newman Dorland*, A.M., M.D., F.A.C.S., Lieut.-Colonel, M.R.C., U. S. Army. With the collaboration of *E. C. L. Miller*, M.D. Nineteenth edition. Fabrikoid. Price, $7; Thumb-Indexed $7.50. Pp. 1647, with 914 illustrations. Philadelphia & London: W. B. Saunders Company, 1941.

This is the 19th edition of a dictionary that is known throughout the English speaking countries. It is a brand new edition with over 2000 new words added. There are many excellent illustrations, 100 of them in colors. The terminology conforms to the accepted standards, pronunciation of every word is given, and many other features make this dictionary one that can be highly recommended.

FACTOR ANALYSIS TO 1940. By *Dael Wolfle*. The University of Chicago. Paper. Pp. 69. Price, $1.25. Chicago: The University of Chicago Press, 1941.

This monograph was written as an aid to better understanding of the role of factor analysis as a tool in modern research and interpretation of data in everyday experience. Its objective is to present in logical order the most cognitive methods utilized by science as a control of the many variables associated with statistical problems of practical purposes. Intended originally as a review to be published in the *Psychological Bulletin*, it outgrew the space reserved for it in the *Bulletin* and hence was printed in monograph style. In its present form it was possible to incorporate a complete bibliography amounting to 530 references of publications contributed between the period of 1928 to 1940, to which the author refers only in part and leaves the bulk for collateral reading. The work discusses the practical employment and integration of all forms of experiences in which factors or agencies or conditions play the important part. It deals with and attempts to analyze tangible and speculative problems and tries to answer such fundamental questions as (1) "What is the reasoning common to different factor methods?" (2) "How do the several methods differ from one another?" (3) "How may factors best be interpreted?" (4) "What have been the chief results of factor analysis?" (5) "What are the limitations and uses of factor analysis?" The answer to these questions is discussed in some seven interesting chapters wherein the author points out the various methods at present utilized and the value and limitations of each. For those of our readers interested in the rationale, logic and technic of factor analysis this book is recommended as one of the most cogent and succinct of expositions.

ORBITAL TUMORS. Results Following the Transcranial Operative Attack. By *Walter E. Dandy*. Cloth. Pp. 168. Price $5. New York: Oskar Piest, 1941.

The author calls attention to the fact that surgery of orbital tumors has for many years presented a technical problem to the ophthalmic surgeon. To meet the need for an improved procedure, Dr. Dandy has devised his transfrontal technic, which permits removal not only of the orbital tumor but of any intracranial extension. At the Johns Hopkins Hospital, all tumors lying deep in the orbit, and invariably any tumor in which there is any reason to suspect an intracranial extension, are routinely referred from the ophthalmologic to the neurosurgical service for operation. This monograph of Dr. Dandy's is thoroughly satisfactory and entirely justified on the basis of arbitrarily separating orbital tumors into two groups, one in the domain of the ophthalmic surgeon and one in the domain of the neurosurgeon. Miscellaneous tumors of the orbit are given careful consideration. A number of cases of Schüller-Christian's disease are reviewed and commented on. An interesting and valuable contribution is the pathologic study of all cases. The operative procedure is discussed. After a careful consideration of all these phases, conclusions are drawn. The experience which Dr. Dandy has had in this field thoroughly qualifies him to make a contribution of this sort. The problem is far from solved, but with the added information now available it is clear that greater success will be attained through the cooperation of the ophthalmologist and the neurosurgeon. The style of the book is somewhat original. The illustrations are extremely valuable in clarifying the text.

PHYSICAL THERAPY ABSTRACTS

Changes in Retinal Arteries Before Convulsions Induced by Electric Shock. Eugene C. Milch.

Arch. Neurol. & Psychiat. **45**:848 (May) 1941.

The role of the vascular bed long has been of interest to epileptologists.

The electric shock per se has no prolonged effect on the artery, and any immediate effect is one of dilatation, as indicated by the two observations made in three to four seconds after the passage of the current. In all subjects in which a sufficiently prolonged period of unconsciousness precedes the active convulsive state the retinal arteries constrict prior to the onset of the convulsion. In the majority of cases in which no retinal constriction occurs during the period of "absence" no convulsion occurs. Three observations of thirteen tended to refute this.

From the observations, one may conclude that in cases of convulsions following electric shock a spasm of the retinal arteries, during the "absence," usually precedes the generalized convulsion and that as a rule a spasm does not occur if the effect of the shock is to give only a "petit mal" seizure or an "absent" state. In addition, if one can infer that the appearance of the retinal artery accurately reflects the condition of the smaller cerebral arteries, one may conclude that the arterial spasm does not cause the convulsion but is itself an early part of the process sent into action by something else, in this case the electric shock.

Effort Syndrome. Diagnostic and Therapeutic Value of Exercises. Sir Adolphe Abrahams.

Lancet **1**:437 (April 5) 1941.

The term effort syndrome is one which is employed in lieu of a better, with the understanding that none will be universally acceptable. It meets the generally established definition of the condition as one of ill health in which the signs and symptoms produced in normal subjects by excessive exercise are called forth by lesser amounts and in which no physical signs of structural disease are discovered. Alternatively, it may be defined as an abnormal physiologic reaction to effort with the production of breathlessness, disproportionate or premature exhaustion, palpitations, precordial pain, faintness, dizziness and blurred vision.

Graduated exercises have been recommended as a kind of universal treatment. The differences in individual athletic ability are well recognized, but it is argued that by exercise some degree of improvement is possible to everybody and that the grading which in consequence results will be of practical value.

A course of physical training will usually benefit the underdeveloped, ill-nourished youth who has lived under bad conditions, physical and hygienic, and who partly from disinclination and partly from lack of opportunity has never taken exercise.

If properly organized, exercises have a psychologic value. Their character must be varied, they must be intrinsically interesting instead of mere monotonous repetitions of sterotyped movements and they must demand unremitting attention. In this way it is possible to insure half an hour's sustained activity in a man who would fall out in five minutes of the tedious procedure comprehended under the one-time P. T.

Exercises serve a useful purpose in grading. If a man can accomplish half an hour of systematic vigorous exertion and at the end exhibit no distress and no undue delay in deceleration of the cardiac rate, his circulatory integrity is established and there is no reason why the physical requirements of an ordinary military life should not be met. But no system of exercises can test the reaction to unalluring or distasteful circumstances or guarantee that symptoms and even physical signs will not be forthcoming when escape is sought from an intolerable situation. This is a psychologic problem and it must be left to the psychiatrist, not to the clinical physician, to assess the individual's probable reaction to circumstances and responsibilities.

A Physiological Study of the Skin Resistance Response in Man. E. A. Carmichael; W. M. Honeyman; L. C. Kolb, and W. K. Stewart.

J. Physiol. **99**:329 (March) 1941.

The degree and the latency of the skin resistance response are uninfluenced by cessation of blood flow induced by rapid arterial occlusion, if care is taken to maintain the temperature and the sweating at its previous level. It has been shown that after cessation of blood flow, vasomotor and sweating activities are not impaired for a short period. Analysis of these factors has been attempted previously with variable results. Veraguth (1906) and Jung (1939) exsanguinated the arm and reported the response as unaltered. Densham and Wells (1927) stated that they found a 50 per cent decrease in the response following this procedure, while Goadby and Goadby (1936) found that the skin resistance response disappeared while the electromotive change remained unaffected. It has been possible to show that on devascularization the response is initially reduced by 75 per cent with a further progressive decrease in value toward abolition, which is related to the cessation of sweating. The time interval is variable, but the response is generally not detectable after ten minutes. From these ex-

periments it may be said that the response is not wholly vascular in origin, although the proportion due to sweating cannot be definitely assigned, because of some coincidental reduction.

The dependence of the skin resistance response on the activity of the sympathetic nervous system is illustrated experimentally by its abolition with a combination of the effects of atropinization and devascularization. It is also shown clinically in cases of damage to the system. In one case in which there was complete bilateral lumbar sympathectomy no response was obtained from the toe, while in another case in which there was a lesion of the cauda equina involving motor and sensory roots from L_2 downward, good responses were obtained.

It may, therefore, be concluded that the change in skin resistance to a given stimulus results from activity of the sympathetic nervous system and is dependent on two factors — sweating and vasomotor activity.

A study of the physiologic basis of changes in skin resistance following various sensory stimuli has been made in man.

If the subject has been adequately warmed the response may be obtained from any part of the extremities, the body wall and the ears.

The latency of the response varies according to the part of the body from which it is recorded and also with the temperature of that part.

The response is indicative of activity of the sympathetic nervous system, being dependent on the synchronous development of both vasoconstriction and sweating, occurring when either of these components is present but being abolished when both are absent.

Physical Medicine, Orthopedics, and the Services.

Editorial Brit. M. J. **4190**:633 (April 26) 1941.

Some dissension has arisen between the specialist in physical medicine and the orthopedic surgeon. Orthopedic surgeons have been heard to claim that they are capable of seeing their cases through from beginning to end, and that unless they can do so their results are handicapped or even completely marred by the "interference" of the specialist in physical medicine. The consultant in physical medicine has been heard to say that the orthopedic surgeon makes no attempt to evaluate, in close collaboration with him, other methods, and that he, the orthopedic surgeon, has inadequate knowledge of the various means employed in physical medicine. This disagreement between the two branches is unnecessary and hinders progress. A glance over the field of those who practice physical medicine, whether in spas, by expert prescription of massage and medical exercises, by occupational therapy or by the more direct physical methods of electrical currents, will make it clear that their work is the medical counterpart of the orthopedic surgeons. If consultants in physical medicine were regarded as "orthopedic physicians" their field of activity would become clear and their function in relation not only to orthopedic surgeons but to the whole medical profession would drop into its proper place and perspective. Their advice, special knowledge and collaboration could be sought without fear of trespass or overlap. It is satisfactory, therefore, to note that the Director-General of the Army Medical Service has realized the importance of this branch of practice by the appointment of a Consultant in Physical Medicine with the rank of a higher consulting officer. The duties attaching to this new post go further than advising and helping in the physical treatment of injured soldiers and convalescents. The Director-General has, wisely, looked to the knowledge of function and movement possessed by this adviser to help and guide him in the conditioning of recruits, especially those with physical handicaps who are amenable to intelligent reeducation and remedial exercises. The consultant and his chosen team are available to help those whose special duty it is to train the recruit forward into fitness and hardness. Here indeed is a means for joint work in preventive medicine and one that should promote close and warm liason between our profession and the commanders in the field. With such an organization in effective operation the orthopedic surgeon could feel assured not only that his results would not be marred but that they would be improved, thus freeing him from anxieties about the final stages of treatment and enabling him to concentrate upon the vast surgical problems that already face him.

Studies in Pelvic Iontophoresis of a Choline Compound. II. Preoperative Management of Uterine Myomas Complicated by Pelvic Infection, With a Report of 39 Cases. Charles A. Gordon, and Alexander H. Rosenthal.

Am. J. Obst. & Gynec. **41**:1043 (June) 1941.

The authors in their conclusions state: Attention is called to the risk of operation if myomas are associated with pelvic inflammation. Iontophoresis to the pelvis was given during the preoperative preparation of 39 patients with myomas of the uterus associated with pelvic inflammatory disease, degeneration of myomas, or both. Hysterectomy was performed in 32 cases, and in 27 one or both tubes and ovaries were excised. Material for pathologic study was available, affording an opportunity for determining the type of disease treated and the effects produced.

The preoperative preparation of myomas associated with pelvic inflammatory disease may often be shortened by this method of therapy, and the operative risk decreased.

In cases of myomas complicated by degeneration, iontophoresis either had no effect or accentuated the degenerative processes.

In cases of myomas, in which the differential diagnosis between accompanying infection and degeneration is difficult, iontophoresis may be helpful in preventing undue preoperative delay while awaiting satisfactory laboratory data.

Conservative Treatment of Sciatic Pain in Low-Back Disability. John G. Kuhns.

J. Bone & Joint Surg. **23**:435 (April) 1941.

A description of the conservative treatment and a report of the results in 1000 patients seen for sciatic pain and low back disability during the past ten years are given. By conservative management is meant the use of rest in special positions, support, medications, and physical therapy.

What can be regarded as adequate treatment of the usual cause of low back disability,—a muscular or ligamentous tear in the supporting structures of the lumbar spine and pelvis? It would be reasonable to believe that the treatment would be similar to that applied to muscular and ligamentous tears elsewhere in the body,—that is, rest with the injured structures in a position of relaxation until healing is at least partially completed.

It is possible to secure relaxation of most of the posterior ligamentous structures about the sacrum and lumbar spine by supine recumbency with the lumbar spine flat, and with slight flexion (20 to 30 degrees) of the hips. This has been demonstrated in the cadaver.

The best method of securing immobilization and ligamentous relaxation low in the back is to keep the patient constantly on a firm bed with the entire body horizontal except for slight flexion at the hip joint. This can be secured in the supine position by placing a pillow under the knees, or in the prone position, under the abdomen. Only in the mildest of injuries low in the back is the patient permitted to be ambulatory.

In most instances while the patient is in bed, physical therapy, consisting of the use of heat daily, should be given to the posterior surface of the spine and pelvis to improve local circulation, to relax muscle spasm, to relieve pain, and to hasten the absorption of inflammatory exudates. As soon as muscle spasm and pain begin to subside and the patient can move in the bed without much discomfort, exercises can be given to the patient to teach him muscular coordination so that he may improve the balance and carriage of the entire body and thus prevent further strain. The period that the patient must be kept recumbent varies greatly. Complete recumbency should be continued until pain and local tenderness have almost entirely subsided.

If this study is to be of value it should suggest which types of low back pain will probably be relieved under conservative management: (*a*) Acute traumatic and chronic postural strains of the low back; (*b*) structural changes in the vertebra or their contiguous structures. Where structural restoration cannot be expected, as in metastatic malignancies, conservative therapy may prolong function and is a good palliative measure; (*c*) low back pain from pressure or irritation within or about the spinal canal. In this group conservative treatment may be of little avail; (*d*) pain referred to the back from other parts of the body, usually the abdominal and pelvic viscera. There were no patients in this series of 1000 cases with low back pain of this type. Here the lesion, which causes pain referred to low in the back, should be treated.

Convalescent Care at the Saratoga Spa. Edward J. Callahan.

New York State J. Med. **41**:604 (Mar. 15) 1941.

The mineral waters that are available at the spa are indicated internally in a wide range of convalescent cases. They may be divided into three major groups: 1. The alkaline, effervescent, noncatheratic waters, represented by Geyser, are indicated in chronic gastric diseases and where the effect of a general tonic water would be of value. 2. The alkaline, mildly saline group, such as Coesa water because of its mild laxative action, is safely used in catarrhal diseases of the gallbladder and in the milder forms of irritated colons. 3. The alkaline, strongly saline waters, of which the Hathorn Nos. 2 and 3 are the best representatives, are used primarily for the relief of constipation.

The balneotherapeutic procedures available include: 1. The use of the mineral-water baths alone, either in the form of full gas strength baths and full position in the tub or modified mineral baths in which the strength of the carbon dioxide gas or the position of the patient in the tub is varied. 2. The mineral bath may be followed either by a general body massage or by the use of hot mineral packs to local affected areas either with or without local massage and movement. The frequency of this combination of bath and massage depends again on the ailment from which the patient has been suffering. 3. The eliminating treatment consists of variable combinations of heat, underwater massage, and douches, using plain water. Either the hot room or the electric cabinet may be used, associated with the various forms of underwater massages, water rubs, and salt and soap rubs and followed by the alternate hot and cold sprays. 4. The combination of either the mineral bath plus the body massages, local or general, or the mineral baths plus the body massage plus the many varieties of the eliminating routine may be used.

Fractures of Both Bones of the Forearm in Children. Boardman M. Bosworth.

Surg., Gynec. & Obst. **72**:667 (March) 1941.

There were 50 patients in the series. Colles' fractures and epiphyseal separations have not been included in the series. In all but 2 cases the radius and the ulna were broken at approximately the same level.

For immobilization, anteroposterior plaster splints were usually applied so as to include the wrist and the palm but not the elbow. In 5 of the 11 cases in which there was overriding the splint was made to include the elbow; in the 6 others it is not recorded whether the elbow was immobilized. Some form of immobilization was maintained for an average of four weeks and the patient was discharged after an average period of

five weeks following reduction, excepting 4 patients who were watched between three and four months. In only one instance was it recorded that a fluoroscopic examination had been made during reduction, although the fluoroscope may have been used in the others.

Physical therapy consisting of baking and light massage was used for about half the patients though when it was commenced and how long continued could not usually be determined from the record.

The author states in his conclusion:

1. During the seven year period from 1932 to 1938 inclusive, 50 children aged 16 years and under were treated from the outpatient department and wards of St. Luke's Hospital for shaft fractures of both bones of the forearm.

2. Of these 50 children 32 were examined personally and follow-up roentgenographic reexaminations were made approximately five years later.

3. Twenty-five of the 32 were treated by closed reduction with no bad result and in 27 of these there were excellent anatomic and functional results.

4. Four were subjected to open reduction with satisfactory results in 3 patients and a good clinical result in the fourth despite a non-union and pseudarthrosis of the ulna.

In children with shaft fractures of both bones of the forearm, complete anatomic reduction with end-to-end apposition of the fragments is not essential to good functional and cosmetic recovery. Open reduction of such fractures in children is rarely indicated.

The Rate of Healing of Tendons: An Experimental Study of Tensile Strength. Michael L. Mason, and Harvey S. Allen.

Ann. Surg. **113**:424 (Mar.) 1941.

The problem of healing of tendons and the factors which affect it are still unsettled. Despite a great number of experimental and histologic studies which have appeared during the past thirty or more years, there is still lack of agreement concerning even the tissues which take part in the process.

The authors' conclusions are as follows: 1. Tendon healing as measured by its tensile strength exhibits three phases: (*a*) phase of rapid diminution, which lasts about five days; (*b*) phase of increase in tensile strength up to a plateau, which it reaches about the sixteenth day, and (*c*) second phase of increase in tensile strength, which probably starts between the nineteenth and the twenty-first day and continues for an undetermined period.

2. Curves of tensile strength conform to phases observed in the histologic process of repair: (*a*) phase of exudation and fibrinous union, (*b*) phase of fibroplasia, and (*c*) phase of maturation or organizing differentiation.

3. The function to which the healing tendon is subjected is directly reflected in the curve of the third phase of healing. During the first and second phases it produces no effect unless it is so great as to cause marked separation. During the third phase of healing function accelerates the curve.

4. Function and motion during the first two phases of healing lead to increased reaction and to separation at the suture line. Restricted use of the tendon, started on about the fourteenth day and continued for one week, or preferably two, may be expected to lead to only a slight increase in reaction and to a rapid increase in tensile strength of the union. Active unguarded use even after three weeks of immobilization may be associated with stretching of the suture line and always leads to increase in reaction.

5. The holding power of the tendon for the suture shows a marked drop below its original power and does not begin to rise until the fifth day after suturing. It does not rise consistently above the strength of the sutures until the fourteenth day. Although the strength of union for the first nine days is essentially due to the suture, it is not so great as the immediate sutured strength until after fourteen days. The importance of adequate relaxation during this time is evident.

Treatment of Post-Radiation Necrosis by Radiation Therapy. Albert Eidinow.

Brit. J. Dermat. **53**:171 (July) 1941.

Isolated warts can be excised by the use of the surgical diathermy current; small multiple warts may be removed by fulguration. At times multiple warts can be dispersed by massive dosage of ultraviolet irradiation.

In the managemnet of chronic ulceration, the value of local light treatment depends on the success in organizing blood supply to the area of ulceration. The technic of local ultraviolet irradiation carried out at the Radium Institute aims at the production of a full erythema or counterirritation effect. The area of ulceration is cleaned with acetone or ether, pus and surface exudation are removed and the surrounding skin thoroughly cleansed. The area selected for irradiation is marked out by means of a dermatograph pencil. The water-cooled or the air-cooled quartz mercury vacuum lamp is employed. These lamps are operated at their maximum capacity, i. e., 5 amperes and 140 volts between the electrodes. The lamps are placed as close as is practicable to the lesion, the surrounding area being protected with crepe paper and adhesive strapping. The dose of ultraviolet irradiation is equivalent to fifteen to twenty times the erythema dose for the normal white skin. Directly after irradiation the lesion is covered with adhesive plaster, the adhesive surface being sterilized by exposure to the radiation of the mercury vapor lamp. The dressing can remain for four to five days and is then reapplied. Treatment is given at intervals of fourteen days. The dose of light should produce a full blistering reaction in the skin surrounding the lesion; dosage must be increased until such reaction is obtained.

Short Wave Diathermy in Chronic Prostatitis. Donald K. Hibbs, and Stafford L. Osborne.

Am. J. Med. Sci. **201**:547 (April) 1941.

Inductotherapy is effective in reducing the subjective symptoms of chronic prostatitis. A majority of the patients revealed a lowered pus cell count in expressed secretion, but the cases could not be followed long enough to to make a fair comparison with mechanically accomplished drainage. It is interesting that there was no significant rise of temperature in the prostatic urethra when the Elliott machine was used. Inasmuch as several reports appeared attesting to its value in the management of prostatitis, the question arises as to whether a rise of temperature is essential to obtain therapeutic results. That a rise of temperature is essential to secure maximum vasodilatation and flow of the blood is the prevalent opinion although this opinion has never been fully established. Johnson, Scupham and Osborne have shown that there is apparently an optimum temperature for the maximum blood volume change and once this is exceeded there is apparently a decrease in the blood flowing to the part.

Herring, using conventional diathermy, reported a prostatic urethral temperature of 106 F. and 0.5 F. rise over normal when using the Elliott machine. He claims that a temperature of the tissues is necessary for a therapeutic result, and that the temperature should range from 105 to 106 F.

Mikel and Taube attributed their successful results secured when using the Elliott machine to the fact that a much greater application of heat was possible. They stated it was a more efficient means of applying heat because known temperatures could be maintained. Other methods, they stated, lacked constancy of temperature and lacked control of heat.

Likewise, Lewis states that the immediate effect of the use of the Elliott machine is a localized hyperemia of the pelvis and a local elevation of temperature. It would appear from the temperature studies of the author that success of the Elliott treatment cannot be attributed to an increased temperature, and it may well be that an increment of heat is not essential. An increased hyperemia could readily occur as a result of the treatment and this may explain the therapeutic results secured.

The authors state in their conclusion: 1. Eighty-five patients suffering with chronic prostatitis were each given an average of 10 inductothermy treatments. 2. Inductothermy was effective in reducing the subjective symptoms of chronic prostatitis. 3. Objective conditions were improved in a majority of instances. 4. Posterior urethral temperatures were taken by means of thermocouples. An average rise of 2 F. was obtained when using the electromagnetic field. 5. The highest posterior urethral temperature was obtained by means of conventional diathermy. There was no significant temperature rise when the Elliott hot water treatment was given.

Human Skin as a Conductor of 60 Cycle Alternating Current of High Intensity, Studied on "Electroshock" Patients. Hans Lowenbach, and Jasper E. Morgan.

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The management of mental disorders with electric "shock" provided a new opportunity to examine the living human skin as a conductor of a 60 cycle alternating current of relatively high intensity (300-1,000 milliamperes). In a first series of experiments (31 subjects, with 98 single "shocks") an ink-writing oscillograph recorded the impedance offered to a potential of about 20 microvolts. The electrodes (round copper plates, 5 cm. in diameter, electrode jelly between metal and skin), lay on both temples. A second ink-writer served as a recording milliammeter of the "shock" current which was applied through the same electrodes. In a second series the "shock" current was recorded with an oscillograph able to follow frequencies up to 15,000 cycles for detailed analysis of amplitude and wave form. Finally, human corpses shortly after death and excised skin for a period of several weeks were tested for their conductance.

When 50 to 120 volts are given for from one-tenth to four-tenths of a second, the impedance drops instantaneously to a value between 270 and 120 ohms regardless of the original impedance, if the latter was kept at or below 2,000 ohms. In females the decrease is slightly smaller than in males. During the time of current flow there is no further gross change in the impedance. The waves do not deviate perceptibly from the sine form. When the current is broken, the impedance — to 20 microvolts — rises suddenly by 80 to 150 ohms, depending on the "shock"-tension applied; it then increases over a period of many seconds, approaching the original value asymptotically. The return to pre-"shock" impedance takes place faster after low tensions than after high ones. A second "shock" given while the impedance is still low produces the same current as the previous one.

The skin of human corpses reacts similarly to that of living persons. However, the impedance drop is less with increasing interval between the time of death and of examination. Excised skin gradually loses the properties of the living skin and, finally, conducts like other organic material; i. e., it follows predictably the laws of electrolytic conduction.